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THE PRACTITIONER:

A JOURNAL

OF

THERAPEUTICS AND PUBLIC HEALTH.

EDITED BY

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VOL. XIV.

JANUARY TO JUNE.

London:
MACMILLAN AND CO.
1875.

421246
3.4.44

LONDON:
R. CLAY, SONS, AND TAYLOR, PRINTERS,
BREAD STREET HILL.

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CONTENTS OF VOL. XIV.

ORIGINAL COMMUNICATIONS :—

	PAGE
On the Treatment of the Diarrhœa of Typhoid Fever. (Part of a Clinical Lecture.) By George Johnson, M.D., F.R.S.	1
Dr. Klein on the Pathology of Small-pox and Typhoid Fever. By the Editor	5
On the Alleged Successful Treatment of Typhoid Fever by "Cold." By Frederick T. Roberts, M.D., B.Sc., M.R.C.P.	11
Further Illustrations of the Therapeutic Uses of Phosphorus: in Angina, Essential or Pernicious Anæmia, Leucocythæmia. By W. H. Broadbent, M.D.	16
Calculous Disease of the Kidneys—Renal Abscess—Calculous Pyelitis. By W. R. Basham, M.D.	28
Physiology of Micturition and Retention of Urine. By Henry Power, M.B.	38
On the Examination of Patients suffering from Eye-disease. (Being an Extract from a forthcoming volume of "Essays on the Diseases of the Eye.") By R. Brudenell Carter, F.R.C.S.	46, 103, 251
Copaiba as a Diuretic. By E. L. Dixon, L.R.C.P.	81
On a simple Process for Estimating Urea in Urine. By W. J. Russell, Ph.D., F.R.S. and Samuel West, B.A. Oxon	86
On the Treatment of Rheumatism and Gout with Trimethylamine. By W. H. Spencer, A.M., M.B. Cantab.	90
On the Physiology of the Act of Vomiting. By W. H. Broadbent, M.D., F.R.C.P.	109
The Treatment of Diarrhœa. By David Young, M.D., Florence	161
On the Treatment of Rheumatism and Gout with Trimethylamine. By W. H. Spencer, A.M. M.B., Cantab.	165
On a Modification of the Method of using Malgaigne's Screw-hooks in Transverse Fracture of the Patella. By James Spence, F.R.S. Ed.	183
On the Treatment of Fracture of the Patella. By Geo. W. Callender, F.R.S.	186
The Treatment of Fractures of the Patella and Olecranon by the Expectant Method. By Arthur Fergusson M'Gill, F.R.C.S.	188
Differential Diagnosis between Calculous Pyelitis and Tubercular or Scrofulous Pyelitis. By W. R. Basham, M.D.	192
The Therapeutic Value of the Balsam Copaibæ. By A. R. Hall	241
On Puerperal Eclampsia. (Notes of a Clinical Lecture.) By Dr. Matthews Duncan, F.R.S. Ed.	245

PAGE

On the Relief of Toothache by Bicarbonate of Soda. By Dyce Duckworth, M.D., F.R.C.P. 260

On the Monobromide of Camphor. By Robert Lawson, M.B. (Edin.) 262

On the Successful Treatment of a Case of Peritonitis and Diphtheria by Digitalis. By John Haddon, M.A., M.D. 271

Four Cases of Hæmaturia, without Albumen, constantly alternating with large Deposition of Uric Acid. By E. J. Shearman, M.D., M.R.C.P., F.R.C.S., F.R.S.E., &c. 275

On the Rational Treatment of some forms of Hemiplegia. By Dr. Alfred Carpenter 321

A Case of Enteric Fever, apparently of Pythogenic Origin.—Death on the 27th day, after a seemingly favourable course of the Disease. By Alfred L. Carroll, M.D. (Univ. N.Y.), New York 332

On the Relief of Toothache. By J. Smith Turner, M.R.C.S. . . . 336

On some Cases of Syphilitic Nervous Disease. By J. Dreschfeld, M.D. &c. 343

On the Differences of Action of Induced and Continuous Constant Currents on the Muscular System, from a Clinical point of View. By Dr. Onimus, of Paris 401

Two Cases of Lead-poisoning, with very large quantities of Albumen in the Urine. By E. J. Shearman, M.D., M.R.C.P., F.R.S.E., &c. 420

Tubercular or Scrofulous Disease of the Kidneys. By W. R. Basham, M.D. 422

On the Plan of Treating the Diarrhœa of Typhoid Fever by Diet alone. By Henry Kennedy, A.B., M.B. 432

On the Physiological Action of some New Morphine and Codeine Derivatives. By F. M. Pierce, M.D., L.R.C.P. (Lond.) . . . 437

REVIEWS OF BOOKS:—

Therapeutics, Materia Medica, and Toxicology, with especial reference to the application of the Physiological Action of Drugs to Clinical Medicine. By H. C. Wood, jun., M.D 55

A Handbook of Therapeutics. By Sydney Ringer, M.D. 55

Pharmacographia. A History of the principal Drugs of vegetable origin met with in Great Britain and British India. By Friedrich A. Flückiger and Daniel Hanbury, F.R.S. 56

Free Phosphorus in Medicine. By J. Ashburton Thompson 122

The Journal of the Chemical Society, containing the Papers read before the Society, and Abstracts of Chemical Papers published in other journals 122

A Practical Treatise upon Eczema, including its Lichenous and Impetiginous forms. By Dr. McCall Anderson 123

The West Riding Lunatic Asylum Medical Reports. Edited by J. Crichton Browne, M.D., F.R.S.E. 199

The Maintenance of Health. By J. Milner Fothergill, M.D. . . . 201

On the Curative Effects of Baths and Waters; being a Handbook to the Spas of Europe. By Dr. Julius Braun, including a chapter on the Treatment of Phthisis by Bathing and Climates, by Dr. Rohden. An abridged translation, with Notes, by Hermann Weber, M.D., F.R.C.P. 281

Consumption and Tuberculosis; their Proximate Cause, and Specific Treatment by the Hypophosphites upon the principles of Stœchiological Medicine. By John Francis Churchill, M.D. Paris. With an Appendix on the Local Treatment of Respiratory Diseases by Specific Stœchiological Inhalants 282

PAGE
Medico-Electric Apparatus and How to Use it. By Salt and Son . . 286
The Pharmacopœial Companion to the Visiting List and Medical Diaries. By Robert T. H. Bartley, M.D. 287
Diseases of Tropical Climates, and their Treatment. By J. A. B. Herton, M.D. Edin., F.R.G.S. 356
Lectures on Skin Diseases. E. D. Mapother, M.D. 357
Dental Surgery and Pathology. By S. James A. Salter, M.B., F.R.S. 357
A Manual of Diet in Health and Disease. By T. King Chambers, M.D., F.R.C.P. 443
Essentials of Practical Medicine. By Henry Hartshorne, M.A., M.D. 446
Clinical Pocket-Book: an Aid to the Study of Clinical Medicine . . 446

CLINIC OF THE SIX MONTHS:—

The Elimination of Urea in Certain Diseases 126
Therapeutical Effects of Iodide of Potassium 128
Disease of the Vermiform Appendix with fatal issue 129
Treatment of Rheumatic Fever by Cynara (Artichoke) 129
Prevention of Pitting in Small-pox 130
Digitalis and Bromide of Potassium in Delirium Tremens 130
Local Treatment of Lichen Urticatus 130
Cough from Aural Irritation 13
Removal of Foreign Bodies from the Ear 131
Local use of Liquor Ferri Perchloridi Fortior in Cancerous Ulcerations of the Uterus 131
Croup and the Diseases that resemble it 131
Non-nitrogenous Diet in Disease 132
The Treatment of Syphilis by Moist Mercurial Fumigation 204
Treatment of Scabies 204
The occurrence of Organic Forms in connection with Contagious and Infectious Diseases 205
Treatment of Varicose Veins 205
Electro-therapeutics 205
Conservative Surgery 206
Treatment of Bronchocele 206
Treatment of Gleet 206
Treatment of Laryngitis by Veratrum Viride 207
Infantile Convulsions 208
Rhamnus Frangula as a Substitute for Castor Oil 208
Cold Water and Antiseptic Treatment of Typhoid Fever 209
Injuries to the Head 288
Diagnosis of Bright's Disease 288
Therapeutic Use of the Continuous Galvanic Current 289
Foreign Bodies in the Air-passages 289
Diagnosis of Tumours of the Breast 289
Surgery of the Arteries 290
Puerperal Fevers 290
Cardiac Weakness a remote consequence of Railway Injuries . . . 291
Etiology of Puerperal Fever 291
Addison's Disease 292
Imperfect Teeth and Zonular Cataract 292
Chemical States of the Brain 293

PAGE

The Clinical Thermopile 293
High Temperature after Injury to Spine 293
Report on the Results of Major Operations 293
Typhoid Fever 293
Specific Contagia as a Cause of Disease 360
Germ Theory of Disease 360
Vital Action in Life and Disease 361
Action of Picrotoxine and the Antagonism between Picrotoxine and Chloral Hydrate 361
Strychnia Poisoning—Recovery by Hydrate of Chloral 363
Surgery of the Arteries 363
Treatment of Obstinate Vomiting in Pregnancy 447
Surgical Treatment of Aneurism 447
Sulphate of Chinchonidine 448
The Uses of Turpentine 448
Removal of a foreign body in the Pharynx by Pharyngotomy . . . 449
Affections of the Bladder in relation to Ovarian, Uterine, and Peri-uterine Diseases 449
Temperature and Circulation after crushing of the Spinal Cord . . . 450

EXTRACTS FROM BRITISH AND FOREIGN JOURNALS :—

Actions of Jaborandi 57
Poisonous Action of Salts of Nickel and Cobalt 57
Aphonia of eleven years' duration treated by Faradisation 58
Origin of Schirrus 58
Physiological and Therapeutical Action of Phosphate of Lime . . . 58
Horse-hair for Sutures 59
Treatment of Abscess of the Cornea by the application of Friction and the Vapour of Hot Water 59
Treatment of Bright's Disease 60
Treatment of Perforating Ulcer of the Stomach 61
Researches on the entrance of Arsenic and Antimony into the Tissues and Fluids of the Body 133
Removal of a Nævus of the Upper Lid by means of a Ligature . . . 133
Treatment of Obesity 134
Surgical Treatment of Ozæna 134
Administration of Castor Oil 135
Liniment for Scabies 135
Turpentine in the treatment of Poisoning by Phosphorus 136
Researches on the action of Alcohol in Fever 136
Researches on Erysipelas 137
Treatment of Herpes Zoster by Morphia 137
Alcohol and Energy 210
Treatment of Suppurating Ovarian Cysts 211
Injection of Quinine into the Trachea in Severe Cases of Intermittent Fever 212
The application of the Thermometer in Surgery 213
Pathology and Histology of Lupus 215
Therapeutical Action of Iodide of Potassium 215
The True Neck of the Femur, its Structure and Pathology 217
Herpes 217

Rheumatism and Neuralgia 217
Action of Asarum Canadense 218
Effect of Tobacco on the Nervous System 218
Use of Cyanides in Acute Rheumatism 218
Physiological and Therapeutical Action of Ipecacuanha and Emetine 218
Influence of Disulphate of Quinine upon the Intracranial Circulation 295
Strain and Over-action of the Heart 295
Poisoning by Coffee 296
Poisoning by Cigar-smoking 296
Jaborandi 296
Bromide of Camphor 298
The Milk Treatment in India 298
Extirpation of the Parotid Gland 299
Sulphate of Quinine in Erysipelas 299
Luxatio Penis 299
Bacteria and Suppuration 300
Salicylic Acid 301
Antidote to Carbolic Acid 301
Babies' Sore Eyes 301
Poisonous action of Arnica on the Skin 302
Gum-cutting 302
Action of Lobelina on the Circulation 302
The Excretion of Nitrogen in the Urine 302
Treatment of Uterine Flexions 302
The Remedial Use of Water 303
Fracture of Patella 303
Copaiva in Croup 364
Atropia and Veratria in Incontinence of Urine 365
Gelseminum in Calculus 365
Disappearance of Fibroid Tumour during the Administration of Chloride of Ammonium 365
Nitrate of Mercury in Periodical Uterine Hæmorrhages 365
The best method of using Chlorate of Potassium Topically 366
Transplantation of the Conjunctiva of the Rabbit into the Conjunctival Sac of Man 366
Tooth Brushes and Tooth Powders 367
Goa Powder and Po'di Bahia 367
Action of the most common Emetics 368
Cause of the Nasal Twang in Americans 369
Nature of Shock 370
Motor Centres in the Cerebral Convolutions 370
Worms in the Urinary Bladder 371
Carbolic Acid in the Vomiting of Pregnancy 451
Treatment of Ulcers by Dry Earth 451
Action of Jaborandi on the Organs of Digestion 452
Treatment of Hysteria by Chloride of Gold and Sodium 452
Effects of Nicotine in producing Amaurosis 452
Presence of Bacteria in Subcutaneous Effusions 453
The Significance of Congestion Papilla, or "Choked Disc," in Intra-cranial Disease 453
Placenta Prævia 454

PAGE

Condition of the Pupil in Anæsthesia 455
Should Printed Lines be Short? 456
Action of Lobelina on the Circulation 456
Mammillitis 456
Bronchocele 457
Cerebro-spinal Fever 457
Value of Quinine in accelerating Parturition 458
Chronic Gastralgia Cured by Nitrite of Amyl 459
Transplantation of Bone 459
Nocturnal Enuresis Cured by Hydrate of Chloral 460
The Employment of Iodide of Starch in Medicine 460
Intraperitoneal Hæmatocele Cured by Free Incision and Drainage . . 461
Argyriasis from the local application of Nitrate of Silver 462
Action of several volatile substances on the number of the White Corpuscles 462
Action of Aconite and Opium 462
Inversion of the Uterus 463
Chloral Suppositories 464
Neutralisation of Hydrate of Chloral by Carbonate of Soda 464

DEPARTMENT OF PUBLIC HEALTH:—

Another Aspect of the Tyndall Typhoid Controversy 62
Professor Parkes on Hygiene (Second Notice) 68
Hospitals for Contagious Diseases 77
The Value of Death-rates as a Test of Sanitary Condition 143
Public Health Degrees and Certificates 149
Mr. Stansfeld as a Sanitary Paradoxer 153
The Registrar-General's Weekly Return 159
Further Remarks on the Period of Infection in Epidemic Disease . . 221
The New Sanitary Epoch 230
Unsuspected Sources of Mischief from Sewer-air 234
Dr. Buchanan on Crude Death-rates 237
The Arithmetic of Epidemic Progression 308
Sanitary Matters in Parliament 311
The Official Report on Enteric Fever at Over Darwen 315
Cameron, Grimshaw, Reynolds, &c., on Hygiene 318
Lunacy Certificates. By Stanley Haynes, M.D. 376
Famine and Pestilence 388
The Investigation of Enteric Fever.—The Lewes Outbreak 392
The Sanitary Administration of the Local Government Board . . . 398
Mr. John Simon on Filth-Diseases 468
Excrement Nuisance 475

NOTES AND QUERIES 138, 305, 372, 465

CORRESPONDENCE ON PUBLIC HEALTH 306, 374, 466

BIBLIOGRAPHY 141, 220, 307, 375, 467

INDEX 481

THE PRACTITIONER.

JANUARY, 1875.

Original Communications.

ON THE TREATMENT OF THE DIARRHŒA OF TYPHOID FEVER.

(*Part of a Clinical Lecture.*)

BY GEORGE JOHNSON, M.D., F.R.S.,

Senior Physician to King's College Hospital.

THE diarrhœa of typhoid fever, as it is one of the most frequent symptoms of the disease, so is it one of the most troublesome, and one which often causes the greatest anxiety. It is a fact generally admitted that in the great majority of cases the severity and danger of typhoid fever are in direct proportion to the intensity and duration of the diarrhœa. Delirium and other serious cerebral symptoms, pulmonary engorgement, and renal congestion with albuminuria, are comparatively infrequent complications. The treatment of diarrhœa, then, forms a very important part of the management of the disease. During the many years of my connection with this hospital I have had the opportunity of seeing the diarrhœa of typhoid fever treated in very different ways and with very different results, and I propose now to give you, in a few sentences, the results of my experience with reference to this important practical subject.

For a number of years the practice strongly advocated by Dr. Todd was generally adopted throughout the hospital. This consisted in persevering attempts to arrest the diarrhœa by repeated doses of opiates and other powerful astringents. It was then a common practice to give an enema containing from 10 to 15 or 20 drops of laudanum after each liquid stool. The result of this treatment, in a large proportion of cases, was that the diarrhœa continued in spite of the repressive treatment, and meanwhile the intestines were distended with gas, and the abdomen became tumid and tympanitic. Then the patients were tortured by the application of turpentine stupes to remove the tympanitis. The results were altogether most unsatisfactory. Nor is it difficult to explain the failure of this opiate treatment. Without entering upon the consideration of disputed pathological theories, it can scarcely be doubted that one effect of opium must be to render the intestines torpid and to lessen their expulsive efforts, and as a result of this their putrid contents are retained until they decompose and give off noxious gases by which the bowel is distended and irritated, and so the diarrhœa is perpetuated and increased. It is pretty certain that the healing of the ulcers must be impeded by the continual contact of the fœtid morbid secretions, and that the distension of the bowel must cause pain and increase the risk of fatal perforation or rupture.

Now for a number of years we have entirely changed our treatment, and I have gradually arrived at the conclusion that in the treatment of typhoid fever careful nursing and feeding are of primary importance, while, as a rule, no medicines of any kind are required, and when not required they are often worse than useless. The result of this change of treatment has been that diarrhœa is a less frequent symptom than formerly, and when it does occur it is far more tractable, while tympanitic distension of the abdomen is a rare event. The mischievous opiate enemata and the torturing turpentine stupes have disappeared together. I believe that one of the main reasons why we have less diarrhœa than formerly is, that we carefully abstain from the employment of irritating drugs of all kinds. As a rule, a fever patient has the "yellow mixture," which is simply coloured water; and except an occasional dose of chloral to procure sleep, and a tonic during

convalescence, we give no active medicines of any kind. We feed these patients mainly with milk, with the addition of beef-tea and two raw eggs in the twenty-four hours, and we give wine or brandy in quantities varying according to the urgency of the symptoms of exhaustion, especially in the advanced stages of the disease; but in many of the milder cases, and especially in the case of children, we find that no alcoholic stimulants are required from the beginning to the end of the fever, and when not required they are of course best withheld. I have said that we give no irritating drugs of any kind. For a time I adopted the practice which has been strongly recommended, of giving repeated doses of diluted mineral acids. I have long since abandoned this practice, for I am sure that it was injurious, and it was injurious in a very obvious and intelligible way: it irritated the ulcerated mucous membrane of the intestines, it caused pain and griping, and I believe that it often increased the diarrhœa. I have no doubt that the comparative infrequency of severe and obstinate diarrhœa amongst my enteric fever patients during the last few years is partly attributable to the discontinuance of this mineral acid treatment. The extreme sensitiveness of the intestinal mucous membrane during the progress of typhoid fever is obvious and indisputable. It is admitted on all hands that the greatest care is required in returning to solid food during convalescence; a want of caution in this respect has often been followed by a return of pain and diarrhœa, an increase of temperature, and not seldom by a decided relapse. If, then, a slice of bread or a morsel of fish can excite such local and general disturbance even after the subsidence of the fever, how improbable is it that repeated doses of an irritating mineral acid can be given without injury during the height of the fever, when the ulceration of the intestines is actively progressing!

One more hint I wish to give you with regard to the diarrhœa of typhoid fever, which is, that in all probability it is often increased by the patient's inability to digest the beef-tea and eggs which are sometimes too abundantly given. When you have reason to suspect that this may be the case, I advise you for a few days to keep the patient entirely upon milk, which contains all the elements required for the nutrition of the tissues in a form most easy of digestion. I have had a large experience of

the effects of an exclusively milk diet in various forms of disease. In many cases of Bright's Disease it is very efficacious, but one of the inconveniences in some of these cases is its tendency to cause troublesome constipation. In many cases of chronic diarrhœa and dysentery, milk diet will effect a cure without the aid of medicines of any kind. There is now in Twining ward a girl, aged 14, who for four months had been suffering from dysenteric diarrhœa, the stools containing much blood and mucus. She was put upon a diet of milk alone, without medicine: within a fortnight the diarrhœa entirely ceased, and she is now convalescent. For the reason, then, that milk has this antilaxative and even constipating effect in various morbid states, it is, when given alone, one of the best antidotes for the diarrhœa of typhoid fever.

That our treatment of fever cases is not unsuccessful is shown by the results. I find on reference to my case-books, that during the past year, from Nov. 1, 1873, to Oct. 31, 1874, I have had under my care in the hospital twenty-nine cases of fever; fifteen typhoid, and fourteen typhus. Some of the cases have been very severe, but all have been discharged well; not one death has occurred. This very satisfactory result I attribute mainly to the admirable nursing which our patients receive, and to our abstinence from mischievous medication. To only one of these patients was opium given, and that was for the relief of an irritable condition of bowel which remained after a very severe attack of typhoid. A few doses of opium soon put a stop to this, and the patient made a good recovery.

DR. KLEIN ON THE PATHOLOGY OF SMALL-POX AND TYPHOID FEVER.

BY THE EDITOR.

In a paper communicated to the Royal Society in June last, Dr. Klein announced the interesting fact that he had discovered the presence of a vegetable organism, a fungus, in fact, in the pustules of sheep-pox.[1] Sheep-pox possesses a specific virus of its own, and is not the same disease as small-pox, for it cannot be communicated to man; and the different stages of papules, vesicles, and pustules are not so sharply defined as in small-pox. Nevertheless, it resembles small-pox so closely, both in its course and in the anatomical lesions which occur in it, that there can be little doubt that both diseases have a similar cause. If sheep-pox depends on the presence and growth of a fungus in the skin, then in all probability small-pox does so too: although the two diseases may be caused by different species of fungus, one of which will only grow in the skin of the sheep, while the other will only thrive in the skin of man. It is difficult to obtain pieces of skin from small-pox patients, for the sake of examining them microscopically at every stage of the disease, but sheep-pox may be readily studied, for animals inoculated with it may be killed and their skins examined, as often as is necessary. In the hope of thus discovering indirectly the cause of small-pox, Dr. Klein carefully observed the microscopical appearances of the pustules in sheep. He found that for the first two days after the pock begins to appear, there is little or nothing by which to distinguish between it and any ordinary inflammation. The lymphatic vessels of the corium

[1] Proceedings of the Royal Society, vol. xxii. p. 388.

are filled with a granular material, resembling coagulated plasma. About the third day, however, the contents of the lymphatics begin to exhibit very peculiar characters, for organisms of a distinctly vegetable nature appear in the granular matter. The granules begin to proliferate and form necklaces which give rise to filaments. The lymphatics now contain round or ovoid bodies and branching filaments. The filaments are sometimes separate from one another, and easily distinguishable; at other times, they are closely interlaced and form a felt-like mass. They grow rapidly, and in one or two days they fill most of the lymphatics of the corium. The masses which they form are now found to consist of the same elements as ordinary mould, viz., a spawn or mycelium of filaments, frequently jointed, from which other secondary filaments spring and bear the fructification or conidia. When the pock reaches the vesicular stage, the vesicles are found to contain masses like those in the lymphatics, but with thinner filaments and smaller conidia. Lymph corpuscles now wander in great numbers from the corium into the vesicles, and thus convert the fluid into pus; while the corium, previously crowded with them, becomes entirely free from them, and pustulation is complete.

If a little of the lymph just described be taken from the vesicles it will, when inoculated, communicate the disease to another animal. The virus has been shown by Chauveau and Sanderson to be contained in the solid particles, and not in the fluid part of the lymph, and it is therefore highly probable that these fungi are the *materies morbi* in sheep-pox. This being the case, it follows, as has already been said, that a fungus of a similar kind is, in all probability, the *materies morbi* in small-pox.

The success of these investigations has induced Dr. Klein to extend his researches to the pathology of typhoid fever, and in this disease also he has succeeded in demonstrating the presence of a fungus. In sheep-pox the skin is the part where the disease chiefly manifests itself; in typhoid fever the intestine is the part which is chiefly affected. Accordingly we would expect that if the disease depends on the presence of a fungus, it would be found most readily in the skin in sheep-pox, and in the intestine in typhoid fever. According to Dr. Klein's observations

this is indeed the case. The researches which he is conducting on this subject for the Medical Department of the Privy Council are not yet completed, but he has published a short preliminary notice of the results he has already obtained.[1] The difficulties he has to contend with are here greater than they were in the case of sheep-pox, for he cannot obtain specimens at every stage of the disease, and the earliest one he has examined was taken from a patient who died on the seventh day after the occurrence of headache. His observations show that a vigorous absorption of peculiar organisms, which are really fungi, takes place in the intestine over and around Peyer's patches, and that these pass into the lymphatics and veins of the mucous membrane. These organisms appear under two forms. The first class consists of roundish bodies of a greenish-brown colour and varying size, some of them being two or three times the size of a coloured human blood-corpuscle, while others are only one half or one quarter the size. They generally lie together in thick masses of a dark olive-green colour, but whenever they are sufficiently apart from one another to allow of accurate observation (*e.g.* at the margins of masses), numbers of them are found to be undergoing division, so that they present a kidney or dumb-bell shape. The second class consists of micrococci. Micrococci are small vegetable organisms which are from $\frac{1}{2500}$ to $\frac{1}{5000}$ of an inch in diameter, and under a low power appear like little dots (*a*, Fig. 2), but under a high power appear as globular bodies (*b*, Fig. 2). Each of these consists of protoplasm enclosed in a membrane of cellulose which resists the action of caustic potash. They sometimes appear isolated (as at *b*, Fig. 2), but frequently they are found united together by an intercellular substance in twos (as at *c*, Fig. 2), in necklaces (as at *d*, Fig. 2), or in masses, or zoogloea, as they are termed (*e*, Fig. 2).

Both the round organisms already described and masses of micrococci are to be found on the surface of the mucous membrane and at the mouths of the Lieberkuhnian follicles (*a* and a^1,

[1] Centralblatt fur die medicinischen Wissenschaften, 1874, pp. 692, 706; and *British Medical Journal*, Dec. 5, 1874, p. 699.

We understand that the complete description of these researches, with illustrative wood-cuts, will very shortly appear in the Reports of Scientific Researches relating to Pathology and Medicine by the Medical Department of the Privy Council.

Fig. 1). The micrococci appear to be formed by the sub-division of the round organisms; and at an early stage of the disease (seventh day), the number of micrococci on the surface of the intestine is much less than at the twelfth day. Neither the

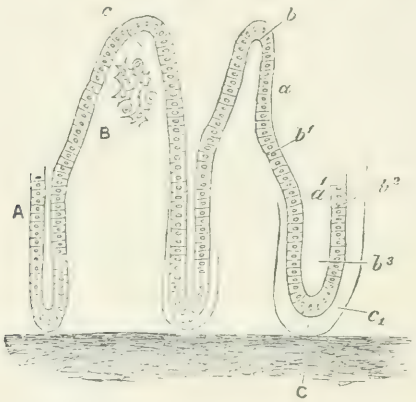

Fig. 1.—Diagram to show the positions of the round organisms and micrococci in relation to the villi and Lieberkühnian follicles of the intestinal mucous membrane. A, Lieberkühnian crypt or follicle; B, a villus, in one part of which is shown the adenoid tissue of which the substance of the villus is composed; C, a lymph space surrounding a Lieberkühnian follicle; *a a'*, first position of the organisms and micrococci at the surface of the intestine and mouths of the Lieberkühnian follicles; *b b' b² b³*, more advanced position of these bodies in the epithelium of the villi, under the epithelium of the villi, in the epithelium and in the lumen of the Lieberkühnian follicles; *c c'*, still more advanced position in the tissue of the villi and the lymph space surrounding the follicles.

Fig. 2.—Micrococci under a low power at *a*. Under a high power: isola at *b*, in twos, forming a dumb-bell at *c*, forming a necklace at *d*, and a zoogl at *e*.

round organisms nor the micrococci remain at the surface of the intestine only. They are absorbed, and are then to be found within the epithelial cells of the villi (*b*, Fig. 1): below the epithelium, and separating it from the tissue of the villus (b^1); in the epithelium of the Lieberkühnian follicles (b^2), and extending down the follicles to their lower end (b^3). They next penetrate still more deeply into the mucous membrane, and may be seen in the substance (B) of the villi (as indicated by *c* in the

diagram), in the lymph spaces surrounding the Lieberkühnian follicles (c^1), and in the veins of the villus and the veins adjoining the follicles. The substance of the villi consists of adenoid tissue, *i.e.*, branching connective tissue corpuscles, forming a network in the meshes of which are contained numerous lymph corpuscles. It is within these lymph corpuscles that those round organisms which have penetrated into the substance of the villi seem to be contained. Those in the veins quickly subdivide and form micrococci in all their different arrangements, twos, fours, necklaces, and zoogloea. From these micrococci there appears to spring a mycelium, the filaments of which are smooth, branched and of a greenish-yellow colour, somewhat like those found in sheep-pox.

At the twelfth day the fungus is not confined to the neighbourhood of Peyer's patches. Numerous masses of micrococci are to be found on the surface and in the substance of the mucous membrane, at some distance from the patches, and in parts where, to the naked eye, it appears only slightly or not at all altered. As the presence of the fungus thus precedes any alteration in the mucous membrane, it is probable that the fungus is the cause of the alteration.

This alteration begins in the follicles of Peyer's patches,[1] and consists in the conversion of the central part of the follicle into a spongy mass from the formation of spaces around the blood-vessels which traverse the adenoid tissue. The lymph cells of the adenoid tissue are converted into large granular corpuscles containing from two to five, or even more, nuclei. These cells with many nuclei appear to divide rapidly into corpuscles with one nucleus.

At the seventh day these alterations are confined to the follicles of Peyer's patches, but on the twelfth day they affect the mucous membrane generally, and the lymph cells of the adenoid matrix of the villi become converted into large, coarse, granular cells, which contain either one large vesicular or hour-glass-shaped nucleus, or several such nuclei. Some of these cells possessed a vacuole, containing two or three small spheroidal nuclei; similar cells were found in the veins of the mucous

[1] The round, closed follicles in these patches must not be confounded with the open, tubular Lieberkühnian follicles or crypts.

membrane, and in both the veins and lymphatics of the submucous tissues.[1]

Although all that we can as yet positively assert with regard to the relation of these fungi to the intestinal lesions in typhoid fever is that they occur together, and we cannot say that it has been conclusively proved that the fungus is the cause of the lesions, yet it is so exceedingly probable that we may accept it, at least provisionally, as proven, and consider what bearing this new pathology will have upon treatment. Of course, if we are to cut short the disease, we must remove the cause, *i.e.*, we must destroy the fungi. But everyone who has attempted to treat skin diseases dependent on the presence of parasitic fungi knows how difficult it is to destroy these organisms, even when they are lying superficially among the cells of the epidermis, exposed to the action of the powerful remedies, or poisons, we might say, which are used for their destruction.

The difficulty is immensely increased when they are no longer confined to the surface as in cases of tinea, but penetrate into the blood-vessels and lymphatics of the true skin, as in sheep- and small-pox; and the case appears to be hopeless when they infiltrate the tissues of the intestine, as they do in typhoid fever. For it seems scarcely probable that we shall find a remedy which will destroy these fungi, protected as they are by a membrane which will resist even liquor potassæ, without, at the same time, destroying the unprotected cells of the mucous membrane itself when applied to it. Still less probable does it seem that we shall find one which, when introduced into the blood and carried by it to the fungi, shall destroy them, without at the same time doing irreparable damage to the delicate cells of the brain and other vital centres, and thus curing the disease only by slaying the patient. Ought we not, then, to direct our utmost energies to the task of preventing the entrance of these deadly fungus germs into the organism, and thus prevent the disease which we can so little hope to cure?

[1] We have to thank Dr. Klein for the courtesy with which he has shown and explained to us many of his microscopical specimens illustrative of the pathology of typhoid fever. We believe the account we have given of his researches to be correct; but for any errors contained in it, we, and not Dr. Klein, are responsible.

ON THE ALLEGED SUCCESSFUL TREATMENT OF TYPHOID FEVER BY "COLD."

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AMONG the remedial measures which are attracting attention at the present time, some of the most important are those which have come into prominence in connection with the treatment of febrile diseases, and which have for their object the application of cold to the external surface of the body. Of course they do not involve any newly-discovered principle, for they are merely revived methods of a plan of treatment which is more particularly associated with the name of Currie, who laid down definite rules as to how and when it should be carried out. These measures have been during recent years much more extensively and generally employed on the continent, and especially in Germany, than in this country; but anyone who is acquainted with current medical literature must be familiar with the fact that they have not been ignored by the profession here, but have been duly recognised as affording valuable aid in the management of fevers, under certain circumstances, and that their efficacy has been tested by several accomplished observers, such as Wilson Fox, H. Weber, Ringer, Thompson, Greenhow, Clifford Allbutt, and others.

The object of the present paper is to offer a few remarks with reference to the alleged advantages of the use of "cold" in typhoid fever. But before considering the matter in connection with this particular complaint, I wish to make some observations of a general character. First, most of the methods by

which the application of cold is effected require much care and attention in carrying them out; they must be conducted under the personal supervision of a competent medical attendant, and their effects need to be thoroughly watched. They have been lately alluded to as "simple remedial measures," but this they are not in any sense, for most of them involve no small difficulty in their execution, especially in private practice, while as regards their effects on the system, they by no means come under the category of simple, harmless measures, such as may be adopted in a routine, off-hand fashion. Secondly, the more evident effects which have been noted from the employment of these applications in febrile cases are, the reduction of the temperature of the body; diminution in the frequency of the pulse; the checking of tissue change, as evidenced by the excretions and by wasting being less rapid; the relief of nervous symptoms; and the modification of the eruption in certain of the exanthemata. The eruption may be encouraged to come out, as in scarlatina or measles; or, it is stated, it may be diminished in amount and improved in quality, as in small-pox. It is in the treatment of cases attended with very high temperature—cases of hyperpyrexia—that the beneficial results of applying cold to the surface, by means of baths, &c., have been most signally obtained; and here it may be said without any exaggeration to have saved the lives of patients who must inevitably have died had not this method of treatment been adopted.

Several German physicians have spoken highly of the treatment of ordinary cases of various fevers, and among them of typhoid fever, to which disease I desire now to call attention more particularly. In a paper on typhoid fever in the recent volume of the St. Bartholomew's Hospital Reports, Dr. Gee considers the use of external cold in its treatment, but apparently rather from a hypothetical point of view than from any actual experience of its advantages. He implies that, if employed at an early period, during the primary fever, it might control the local intestinal lesion, by limiting the number of follicles involved; while in a more advanced stage it might be useful in reducing the secondary fever which accompanies the morbid changes in their progress.

The conclusions of those observers who have practically

tested this method of treatment deserve our thoughtful attention, and it is important to ascertain what they affirm respecting it. None of those who are reliable pretend that they can actually *cure* typhoid fever, either in the sense of checking the disease at the outset, or even of shortening its course. To talk of *curing* or *arresting* this complaint shows a want of knowledge as to its nature. At the best, we can only guide it in its progress, and endeavour to bring the patient successfully through the dangers which he has to encounter. This remark applies not only to the treatment now under consideration, but to any other which claims an influence of this kind over typhoid. Some believe that the convalescence is more rapid after the treatment by cold; but others deny this. So also is there a difference of opinion as to whether it affects the more prominent symptoms, such as diarrhœa, tympanitis, intestinal hæmorrhage, &c.; some asserting that these are beneficially influenced, others that they are not. All seem to agree that it does not increase the tendency to lung-inflammations, or aggravate these if they already exist. The most important statement made is, that this method of treatment has greatly reduced the mortality from typhoid fever, particularly when the cases have been treated from an early period. Certainly the returns made show a great difference in this respect, when the past is compared with the present, and seem to indicate a highly satisfactory result. At the same time, before any certain conclusion can be arrived at, a large number of cases ought to be taken into consideration; for it often happens that a series come under treatment which are of a mild type, and the mortality may present a very low percentage, whatever treatment may have been adopted; while some epidemics are very fatal. Judging from personal experience, and combining hospital with private practice, I believe that the rate of mortality has not been higher in the cases which have come under my own notice than it is represented in the German returns. The mortality in former times was decidedly high, and it would be well to know what modes of treatment were then adopted, as they were not always of a harmless character in days gone by, while the diet and hygienic conditions—most important elements in the treatment of typhoid—were not attended to then as they are now.

Those who adopt this plan of treatment are anything but agreed as to the details of carrying it out. The principal methods employed are frequent cold or tepid sponging of the skin, wet-packing, cold baths, affusion, and tepid baths gradually cooled. Some pursue the treatment vigorously in all cases; others only when the temperature reaches a certain height. There are also differences as regards the duration of each application, the frequency of their repetition, and the length of time during which they are continued.

I venture to state briefly the conclusions which I have arrived at with respect to the treatment now under consideration.

1. It is highly desirable that the members of our profession should be more generally impressed than they are at present, with the usefulness of the various modes of applying cold to the surface of the body in febrile cases, under certain circumstances; and that they should be prepared without hesitation to carry one or other of them out efficiently whenever this plan of treatment is indicated. This applies to typhoid in common with other fevers.

2. On the other hand, to adopt a routine hydropathic treatment of any fever seems to me most objectionable, and this applies especially to the more severe methods which are advocated. As already remarked, they are not easily carried out in general practice; they are certainly not required in a large proportion of cases; most of them are anything but pleasant to the patients, and they may prove very trying and exhausting, especially if frequently repeated, as they usually need to be if the treatment is efficiently fulfilled; while it must be remembered that they are not harmless measures, but may have a powerful influence for evil as well as for good. With regard to typhoid, many cases do not come under observation until it is too late to attempt to check the primary fever, even supposing that the intestinal lesion could be thus limited. For these and other reasons I do not see that, at present at least, a hydropathic treatment of typhoid fever in general practice has any claim to our support. If it is thought worthy of trial, it ought first to be fairly tested in *bonâ-fide* cases of this disease, and under the strictest and most competent supervision. With regard to sponging of the skin, I believe that

this is often very useful, and ought to be employed far more frequently than it is at present, in typhoid as well as in other fevers. With proper care it does no harm, while it often gives much relief, and is beneficial in other respects.

3. The cases in which the more severe methods of applying cold are indicated are those in which the temperature is already very high and remains so, or shows a tendency to rise rapidly, especially if at the same time there are signs of much nervous disturbance. Unquestionably this plan of treatment is not resorted to under these circumstances nearly so frequently as it ought to be. It is difficult to lay down any exact rule as to what temperature indicates the necessity for adopting it, but if it reaches to 106° F. and shows no tendency to fall, or, still more, if it continues to rise, this treatment deserves due consideration. Necessarily much will depend on the actual condition of the patient, and every case must be thoroughly considered in all its features. The best method seems to me decidedly that of placing the patient in a tepid bath, and gradually cooling this. Affusion over the head is useful if there are marked nervous symptoms. Of course it is imperative that this treatment should be always conducted under the strictest supervision, and its effects carefully watched.

FURTHER ILLUSTRATIONS OF THE THERAPEUTIC USES OF PHOSPHORUS: IN ANGINA, ESSENTIAL OR PERNICIOUS ANÆMIA, LEUCOCYTHÆMIA.

BY W. H. BROADBENT, M.D.

In the *Practitioner* for April 1873 I related several cases illustrating the therapeutical uses of phosphorus in certain affections of the nervous system. Its efficiency as a remedy for neuralgia has since been more fully demonstrated by Mr. Ashburton Thompson, Mr. Messenger Bradley, and others, and had indeed been previously observed. The chief object of the present communication is to give the results of its administration in a different class of cases; but I take the opportunity of exemplifying its successful employment in forms of painful neuroses in which it had not previously been tried. I have not yet been able to define the forms of neuralgia in which its uses are specially indicated, though the most striking effects I have seen have been in cases of low nervous tone in which the patient is subject to violent attacks of pain in various nerves. There is one variety in which, according to my experience, it fails altogether; it is that in which a touch, or a movement, or a breath of air affecting a nerve area—usually the inferior division of the fifth—sends a dart of exquisite pain along the nerve and to other branches. The constant dread and apprehension in these cases is a source of greater suffering even than the pain itself, and is thoroughly demoralising. These are the cases which best accord with the theory of Dr. Anstie, whose loss is at this moment so keenly regretted. He attributed neuralgia to centric atrophic change; and though it does not appear to

me that this condition obtains in neuralgia generally, it would seem that here there is a nerve nucleus in a state of morbid sensitiveness, probably due to failure of nutrition, in which an ordinary impression is translated into acute pain.

The cases forming the basis of the present communication in which phosphorus has been of service, are two cases of anginoid pain, one of essential or pernicious anæmia, and one of leucocythæmia.

Anginoid Pain accompanying Aortic Regurgitant Disease.

J. S., aged 56, consulted me on Nov. 3, 1873, complaining of gradually increasing weakness, shortness of breath, and pain in the chest. He considered his ailments to be an exaggeration of the dyspepsia habitual with him, and said he had been getting worse for about twelve months. He was pale, thin, and had a painfully anxious look. The pain which constituted his chief complaint came on at different times, but especially every night, waking him out of his first sleep in a state of alarm and suffering; its seat was the epigastrium and the region of the heart, with shootings down the left arm at times; it was extremely acute, and was accompanied with the anguish of impending death, and with violent palpitation of the heart.

When seen, the heart's action was violent and tumultuous, the beats about 160 per minute; the apex-beat below the normal situation; the impulse forcible. A short double murmur was heard at the right second space. The pulse was irregular, from the fact that many of the heart-beats failed to reach the wrist. Urine normal in all respects.

The patient lived about fifteen miles from London, and I was afraid from his appearance and from the state of the heart that he might not get back alive. I warned his friends, insisted on certain precautions, and he reached his home safely. He had previously been taking muriated tincture of iron, with tincture of nux vomica and digitalis. I ordered this to be continued, and gave also a phosphorus capsule twice a day after food.

He habitually took only two meals a day. I endeavoured, but with no great success, to introduce a third, so as to diminish

the repletion of the vascular system at any one time; and put restrictions on the amount of fluid taken. I ought to add that the patient was most regular and temperate in his mode of life and in all his habits.

On Nov. 10 he was very much better, had had very little pain, had never once been roused by it at night, and had slept well. Pulse 84, not very jerky. On examination of the heart, the usual signs of aortic regurgitation were found, a double murmur at the right second space, the diastolic murmur being audible down the sternum and along its right edge, not to the left. There was also a feeble double murmur at the apex. The impulse was forcible, but not excited; the apex-beat in the fifth space rather below the usual situation. The area of cardiac dulness was little larger than usual; no dulness was made out across the upper sternum or to the right of this bone. Treatment continued.

Nov. 18.—Still better; a twinge of pain occasionally only; palpitation very rare. The disease in the aortic valves was, however, obviously progressive. The double murmur at the right second space was more distinct; the diastolic murmur was heard very distinctly near the apex, and had here its point of maximum intensity; the systolic murmur was audible at the ensiform cartilage, and both systolic and diastolic along the right edge of the sternum. The pulse was more characteristic of aortic regurgitation, and the time lost between the impulse of the heart and the pulse at the wrist was greater than usual. The iron and digitalis were given twice a day, the phosphorus twice daily for another week, then after dinner only.

Dec. 1.—Having continued to improve, he was allowed to leave off all medicine; but on the 16th he had again had the anginoid pain and palpitation for two or three days, and the treatment was resumed.

The patient was not seen again till Jan. 27. He had been spending Christmas with friends at a distance, had been made worse by the railway journeys, and had been miserable and depressed. He complained again of palpitation, but had not much pain, and when seen was suffering from one of the attacks of tumultuous action of the heart, which was beating

at the rate of 160 per minute, the murmurs being confused. He was seen later in the day by Dr. Andrew Clark. The heart had been somewhat steadied in the meantime by a dose of digitalis, and the murmurs were again easily distinguished. Dr. Clark considered them to have a superficial sound, and detected a rub by the enlarged aorta. Digitalis and iron were again given, and a belladonna plaster was applied.

Three days later the pulse was still at 160, but on Feb. 3 the rate had fallen to 116 or 120, the beats being short and irregular; and on Feb. 14 the pulse was only 80. He was gradually failing, however, in strength, and about the middle of March left the neighbourhood of London, and shortly afterwards died suddenly.

In this case the relief of the anginoid pain must be attributed to the phosphorus. It might have been supposed that the tone given to the heart and vascular system by the iron, nux vomica, and digitalis had suppressed the paroxysms had they not already been taken without this result, and the effect was too speedily manifested to have been produced in this way. The nocturnal attacks, which were the most severe, and which were rapidly reducing the patient's strength by the suffering and loss of rest, were probably due to increased arterial tension occasioned by the exposure of undressing and the contact of the surface with the cold bed-clothes; and the inhalation of nitrite of amyl would no doubt have given relief, as in Dr. Brunton's cases, had it been practicable to administer it.

Anginoid Pain in Left Side.

In January of this year, when on a visit to relatives in the country, I was asked to see a young man who had for nearly three months been suffering from severe pain in the side. He had previously enjoyed very good health, was robust-looking, muscular and strong, and was employed as a carrier and carter. Without any previous warning, he was one day suddenly seized with severe pain in the left side. He was unable to move, and felt as if he were dying. Attacks of this kind continued to occur on the slightest exertion, and when I saw him he was scarcely able to leave his bed and was reduced to a state of

extreme weakness. He had also lost flesh greatly and become emaciated. The attacks were in all respects similar to those of angina pectoris in its severe forms, except that the seat of the pain was the left hypochondrium, shooting round the side, instead of being in the region of the heart. While they lasted the perspiration stood in large drops on his forehead and face, and saturated his shirt. I expected to find an aneurism of the abdominal aorta, but, after a most careful examination, failed to discern any abnormal condition of the heart, aorta, or abdominal viscera. Various remedies had been tried, and I recommended phosphorus in the form of capsules, being influenced chiefly by the recollection of its effects in the case previously related, but with very little hope of any good result, as I was still of opinion that the probable cause of the pain was an aneurism, too small to be detected by physical examination, pressing upon one or more nerves near the intervertebral foramina. The effect was, however, remarkable; the pain was almost at once controlled; and that this was not a mere coincidence (such as might have resulted from the complete destruction of a nerve previously compressed) was shown by the fact that several times suspension of the treatment was followed by return of the pain, which was again relieved when the phosphorus was resumed. The patient gradually gained strength, and at the end of rather more than three months was enabled to resume his employment. Although, however, he is at work, and can lift as heavy a weight as ever, he is quite unable to carry it for even a short distance. Another peculiarity is that he is excessively sleepy—falls asleep even when walking with his cart, or while eating—and after dinner can scarcely be stirred up to go to his work. This sleepiness was even more remarkable during the earlier stages of the convalescence. He has also lost his voice, but from what cause I have had no opportunity of ascertaining. He still finds it necessary to take the capsules from time to time.

In employing phosphorus in the treatment of neuroses, I was guided, as I stated in my previous paper, by experience of the uses of arsenic; and I looked for good effects, not from any direct influence upon the nervous functions, but from favourable modification of the organic processes leading to improved nutri-

tion of the nervous structures. The rapidity with which neuralgia is relieved would appear to be inconsistent with this view, as not affording the requisite time for structural change; but it will be seen to be tenable on consideration of the effects of poisonous doses of phosphorus or arsenic.

It is well known that in phosphorus or arsenical poisoning there is induced, besides other changes, a granular, or, as it is sometimes called, a fatty degeneration of the liver, spleen, kidneys, and of the heart and muscles generally—we may almost say a universal degeneration of the more important structures of the body—and this in the course sometimes of two or three days. This has always appeared to me one of the most remarkable facts in experimental pathology; and when it is remembered that 1½ to 3 grains of phosphorus may be sufficient to bring about these extensive changes, it is obvious that the influence of phosphorus on the organic processes by which the structures are maintained is most powerful and profound.

Without pursuing the argument as to the possible exercise of this influence in the removal of the condition of the nervous structures on which neuralgia depends, I may say that the idea of bringing it to bear on the organic processes generally has been my guide in the employment of phosphorus in certain other diseases. That this influence might be favourable seemed to be possible from the marked effects of arsenic in skin diseases, and from the striking improvement in health, appearance, and general condition sometimes seen to follow the administration of arsenic.

The class of diseases to which my attention was turned as affording a field for the application of my views is that in which, with an inevitable tendency to a fatal termination, there is no obvious relation between any discoverable structural lesion and the course of the symptoms or the fatal result. An illustration is Addison's Disease. Here, it is true, there is a particular change in the suprarenal capsules; but though plausible hypotheses have been advanced explaining the pigmentation of the skin and other parts, the gradual failure of the vital powers, and the periodical attacks of faintness and sickness, by reference to the glandular and vascular structure and the supposed functions of these bodies, it cannot be said that they are satisfactory,

especially in the face of the fact that extensive damage, if not total destruction of the capsules by other forms of disease than the cheesy degeneration, may be unattended by the characteristic symptoms of Addison's Disease.

A more remarkable example of a malady progressing to an inevitably fatal termination without obvious cause is afforded by an affection called by Trousseau "essential anæmia," and which has also been named "pernicious anæmia." It appears to me to be closely allied to Addison's Disease. In symptoms they are singularly alike; and essential or pernicious anæmia might almost be described as Addison's Disease without bronzing of the skin, and without disease of the suprarenal capsules. In this, as in other forms of anæmia, the immediate cause of death, and probably the proximate cause of the structural degenerations, is the want of blood; but the cause of the undue waste, or imperfect renewal of the blood, is what constitutes the disease; and the only explanation which presents itself to me is, that there is lacking some influence for want of which the reactions between the blood and the blood-forming organs fail to be effected. The question, then, is, can phosphorus supply this influence?

The following case will exemplify the disease here called "essential anæmia," and serve for comparison with the case treated by phosphorus.

Rebecca L., aged 43, married, was admitted into St. Mary's Hospital, July 2, 1872. She had been ailing four months, having enjoyed good health previously. She first suffered from indigestion and vomiting after food, with pain in the epigastrium and left side. For two months the vomiting had been more severe, and she had also become yellow, the bowels being constipated, the urine dark, and the catamenia scanty.

When admitted she was extremely pale, but rather stout than otherwise, and the skin had a yellow tinge, not however as in jaundice, but like yellow wax, and the conjunctivæ were clear. The lips and tongue were extremely pale, and in fact exactly of the same colour as the skin. There were no stains in the mouth, but there was a brownish stain on the temples and across the forehead, such as is not uncommonly seen in women who have had children. No enlargement of liver or spleen. P. 120. Temp. 98·6°. Skin cool and moist. Urine, sp. g. 1021; dark,

with a copious deposit of lithates: no albumen, bile, or sugar in it. The bowels were confined, but the motions were of natural appearance.

She remained in the hospital till her death on Sept. 17, becoming steadily weaker, suffering from time to time from a sense of extreme faintness and from attacks of vomiting; the vomiting eventually following all food, and the faintness becoming actual syncope, accompanied at times by convulsive movements of the right limbs. The brown tinge on the temples deepened, and there was dark discoloration on the back and sides of the neck. Death was preceded by delirium and semi-consciousness.

Treatment of various kinds appeared to have no influence whatever on the progress of the disease, and stimulants were needed in increasing amount.

At the post-mortem examination the body was not emaciated. The surface had the peculiar sallow or yellow waxy aspect mentioned; there was a slight bronze tint on each temple encroaching on the forehead, a marked, freckled bronze stain on the back of the fore-arms and at the nape of the neck; not elsewhere.

Nearly an inch of fat was cut through on the abdomen: it had a remarkable bright yellow colour. The muscles were small, but of a deep red. All the internal organs were apparently quite healthy, except that the pancreas was larger, firmer, and more vascular than usual. The suprarenal capsules were remarkably small and thin; but in form, colour, consistence, and appearance on section, they were perfectly natural.

The one noteworthy fact was the state of the blood, of which scarcely any was to be found. In the right ventricle was a small fibrinous clot, about the colour of fresh muscle, and a little fluid, watery, claret-like blood; the other cavities and the great veins were nearly empty. The little blood there was stained the hands bright yellow, the yellow colour being removed with extreme difficulty. Both the tinge and the obstinacy of the stain reminded me of the effects of nitric acid. This yellow tint pervaded all the tissues and organs where it was not concealed by the deeper colour of the organ, as was especially seen in the fat and in the lungs; the posterior parts into which

the blood had gravitated, instead of being purple or red, were of a bright canary colour, while the anterior parts were almost white. The blood-corpuscles were not greatly altered; they appeared rather larger and thinner than usual, and many of them were notched, but this is not uncommon. The white corpuscles appeared to be deficient.

The case in which phosphorus was administered is the following:—

Daniel C., aged 41, a gardener, admitted into St. Mary's Hospital, February 7, 1873. He had enjoyed good health, but recently had gradually lost strength, and three weeks before admission had been compelled to give up work on account of weakness and pain in the back and left side. He had also a bad cough; the legs were said to have swollen, and the tongue to have been blistered. It was found also on questioning him that he had had attacks of faintness and vomiting. He said that he had had jaundice and had been yellow one day and white the next.

On admission it was noted that the skin and conjunctivæ had a yellow tinge. No cause for the anæmia could be found; he had not been exposed to paludal miasma, exhibited no trace of lead-poisoning, and had had no illness or loss of blood. He was extremely weak, had cough, and his breathing was short and diaphragmatic, but no abnormal physical sign could be made out in the lungs. The liver dulness extended rather high; no enlargement of spleen; the tongue was pale and flabby, the mouth dry. P. 88, weak. Temp. 98·4°. Urine of a deep tint, not containing albumen; sp. g. 1021.

On February 10th he was twice sick before he had taken any food, and the bowels were relaxed. On the 15th the peculiar sallow anæmic look had become more marked, and the mucous membrane of the mouth and conjunctivæ were as pale as the skin. Anæmic murmurs were heard over the heart. On the 17th an attack of diarrhœa came on and lasted till the 22nd. The prostration was extreme. The skin had the appearance of yellow wax, and the mucous membranes seemed absolutely bloodless; he was confined to his bed, and when placed in a chair trembled and shook till put back to bed.

For a few days after his admission he took phosphate of

soda and taraxacum, afterwards quinine and iron; brandy also was given. On the 19th phosphorus was given dissolved in cod-liver oil, but it was found that the characteristic odour ceased to be perceptible at once, showing that the phosphorus had undergone oxidation; and on the 26th the capsules were ordered to be taken, one three times a day. These were not obtained, however, for several days, and the symptoms on March 4 were even more aggravated. Improvement soon became manifest after the administration of phosphorus was begun, and was remarkably rapid. The yellow waxy look disappeared, the colour and strength returned day by day, and he was soon able to sit up and walk about the ward. Unfortunately the first use he made of his recovered strength was to steal the wine and other things of his companions in the ward during their attendance in the chapel. He was not dismissed, as it was desired to keep him under observation, but he asked permission to go out for an afternoon on some urgent matter, and only returned to insist on his immediate discharge.

I may add that in another case, not under my care, which had all the aspect of essential anæmia, the waxy pallor with attacks of prostration and sickness, and in which iron and the usual remedies appeared to have no effect, recovery took place under the use of phosphorus, which was given at my recommendation.

With regard to leucocythæmia, my reasons for administering phosphorus were much the same as in essential anæmia. I put the real disease further back, so to speak, than the enlargement of the spleen and the multiplication of the white blood-corpuscles, and look upon them as results and signs of an antecedent disturbance of the relations between the blood and certain organs.

Leucocythæmia Splenica.

James K., aged 16, a stable-boy, came under observation at St. Mary's Hospital on Nov. 14, 1873. He was said to have had jaundice and heart-disease, eighteen months previously, from which he had recovered. Lately he had been gradually losing strength, and for a fortnight had been unable to work. The

least exertion brought on sickness. He had had one severe attack of epistaxis.

On admission he was extremely anæmic, the lips and conjunctivæ being almost white, and there was a peculiar fawn or orange tint round the eyes, quite unlike any usual coloration of these parts. Pulse, 102, forcible; marked pulsation in the carotids. Temp. 100·4°. Bowels confined; appetite poor.

There was a little œdema of the legs, and the abdomen was large. The spleen was much enlarged, projecting below the edge of the ribs to the level of the umbilicus, and nearly reaching the middle line of the abdomen; the splenic dulness also extended upwards to an undue degree. Liver rather large.

The cardiac impulse was very strong; the area of dulness over the heart was not increased, but the apex-beat was higher than usual. Soft systolic murmurs were heard to the inner side of the apex, over the pulmonary arteries and aorta, and in the carotid and femoral arteries.

White corpuscles were found in undue proportion in the blood, but did not predominate to the degree expected from the extreme anæmia.

Optic discs normal, but the fundus of the eye generally extremely pale. He was put on broth diet, and allowed 4 ozs. of port. A phosphorus capsule was given, first twice and then three times a day.

Nov. 19.—Spleen larger, reaching below the umbilicus; otherwise better, and appetite returning. Ordinary diet given on the 20th.

On November 23 he began to be sick.

Nov. 26.—Sickness continues. Bowels open. Pulse 132. Temp. 101·8°. Champagne and ice given to control the vomiting.

Nov. 27.—Sickness less severe, but great pain and tenderness in the spleen. Pulse 120. Temp. 102°. There was obviously inflammation of the spleen, and the prostration from the effects of the pain and vomiting combined was so great that death was looked for from hour to hour. Sinapisms and poultices were applied to the left side, iced champagne was given to relieve the sickness, and beef-tea when he could take it. The vomiting ceased on the 28th, and the pain in the splenic region subsided

on the 29th. The spleen remained of the same size. The phosphorus capsules, which had been discontinued when the acute symptoms set in, were now again given.

On December 3 the spleen was already perceptibly smaller, and the liver seemed to be diminishing in size, and from this time there was continuous improvement in all respects. The boy gradually gained colour and strength, and was discharged on January 5th, having taken the phosphorus up to this time. His colour had become positively brilliant, though a tawny tint lingered round the eyes; he was capable of considerable exertion, and the spleen had retreated so as to be almost under cover of the ribs.

He was kept under observation for some time, but suddenly ceased to attend, and from the fact that at his last visit he was complaining of pain and was feverish, it is to be feared that he fell a victim to an acute attack of some kind.

This cannot be set down as a typical case of leucocythæmia. The anæmic appearance was more pronounced than is usual at any stage of this disease, and the excess of white corpuscles, though very considerable, did not correspond to the degree of anæmia. It may be supposed, again, that the inflammation of the spleen was the turning point and led to the improvement. However this may be, it appears to be certain that the very rapid blood-formation was a result of the administration of phosphorus. No other medicine was given from first to last. Leucocythæmia is sufficiently common, so that opportunities for putting the treatment of phosphorus to the test will occur. The diagnosis also is much less difficult than that of essential and pernicious anæmia.

CALCULOUS DISEASE OF THE KIDNEYS—RENAL ABSCESS—CALCULOUS PYELITIS.

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(*Continued from* vol. xiii. p. 399.)

THE pathology and symptoms of renal calculus have been discussed in a former article. Before passing to the consideration of the treatment of renal calculus, and subsequently to the pathology and symptoms of calculous pyelitis, an observation may be offered on one phase of renal calculus which has some practical value, and which may be of importance to the young practitioner. It might be supposed from the detail of the symptoms of this disorder that every case of renal calculus had well-marked stages of development and progress, by which its existence could be recognised and a correct diagnosis of the patient's symptoms arrived at. This is most certainly true of the majority of cases.

The irritative effects of the early deposit and retention of gravelly or crystalline particles, and the subsequent conditions consequent on their escape and passage down the ureters, are in the majority of instances well marked. But there are cases, and those not rare, in which no symptom, typical or even suggestive of calculus in the kidney, has occurred, till the momentary and sudden and unexpected impaction of a calculus in the urethra brings with it all the suffering incidental to the sudden arrest of the urine through this outlet. The symptoms of impaction of a calculus in the urethra have been already described (see *ante*): but these symptoms followed in regular

sequence to those indicative of renal calculus; and the possible contingency of its passing through the urethra might be predicted. But there are cases in which not the faintest suspicion could be excited by the past history of the patient of the presence of a calculus in the kidney, and up to the moment of its escape through the urethra no premonition of any such disease had occurred. Such cases, though not frequent, are occasionally observed. They are met with chiefly in subjects of a gouty diathesis, who nevertheless have not necessarily suffered from the typical form of this disorder.

The calculi thus voided are uniformly composed of lithic acid. They are small in size, rounded, and are of such a shape as might be detained in the pelvis of the kidney and pass down the ureter without giving rise to any symptom. How long they may have lodged in the bladder it is impossible to say, as, exciting no symptom, either in the kidney or in their passage through the ureters, and their existence only known by the momentary detention in the urethra and the cutting pang excited by their stoppage in that channel, all certainty as to their past history and progress is precluded. There is one practical deduction from this form of case, with its comparative immunity from suffering, that a lithic acid calculus thus harmlessly expelled, will, with great probability, be followed by others. Since the former article on this subject was written, the writer has met with an instance, in the case of an elderly gentleman of seventy, who during last summer passed a small lithic acid calculus, without any intimation of any such pre-existing malady, and within the past week (Nov. 20), while passing water, felt a sudden arrest of urine with an agonising, cutting, pungent pain in the urethra, apparently about the membranous part, which after some straining suddenly ceased, with the forcible propulsion of a calculus larger this time than the one passed on a former occasion. This was also unattended with any minatory warnings of the existence of such a substance in the kidney. The oxalate of lime calculus has a less disposition to escape; but when it does, the probability of another following is infinitely small. It is well to recollect that the nucleus of most vesical calculi consists of oxalate of lime, showing how consistent with the above observation

it is that these concretions are more usually retained than voided with the urine.

Before proceeding to discuss the pathology and symptoms of calculous pyelitis, it may not be uninstructive to say a few words on the treatment of calculus impacted in the urethra, or giving rise to symptoms of distress in its passage down the ureter. The former condition rarely requires treatment, as it is sudden in its onset, and usually, after a few moments of straining and violent expulsive effort, the urinary stream forces the calculus before it, and is ejected oftentimes with considerable force. Should, however, the retention continue—and this may happen either from the size of the calculus or a spasmodic contraction of the urethra—then hot baths, or hot hip-baths and opium, may be necessary. If relief be not obtained, surgical assistance will be required. It may happen that the introduction of a bougie may suffice to drive the calculus backwards into the bladder, and if so, steps must eventually be taken to crush the concretion, which has proved too large to pass in its existing shape through the urethra. This, however, rarely happens.

Treatment of Renal Colic.—The passage of a concretion down the ureter, giving rise to symptoms of renal colic, requires prompt therapeutic measures. The most effective treatment is the hot bath, aided by anodynes. The combined effect of moist heat and opium relaxes the spasm of the duct, and relief is safely obtained. In former days great reliance was placed on bleeding from the arm, in addition to the bath and opium. The syncope which even a moderate bleeding may produce was supposed favourable to a more speedy relief by relaxing spasm. Such practice has now fallen into abeyance, and it is very rare to witness a case in which the paroxysmal colic is not speedily relieved by opium and the hot bath.

The temperature of the bath should be maintained at as high a degree as the patient can bear. The more profuse the perspiration induced, the more speedy will be the relief. It signifies very little what form of opium is employed. The writer would prefer the tincture or the liquor opii sedativus to preparations of morphia. When given with a diffusible stimulus, as the sweet spirits of nitre, there is reason to think that the opium more speedily takes effect, and smaller doses are sufficient.

The quantity employed must depend greatly on circumstances, on the idiosyncrasy of the patient particularly. It is best to proceed cautiously with fifteen or twenty minims in a drachm of the sp. æth. nitrosi: if relief is not obtained in an hour or more, half the quantity of opium may be repeated; and this again, watching the effects, in another hour, if no signs of relief or narcotism are apparent. It may be remarked, that the tolerance of the opium is in direct proportion to the intolerance or rather intensity of the pain. While the patient is writhing in agony, an amount of opium may be taken which would speedily narcotise the same individual under the ordinary conditions of health.

Relief once obtained, it is not often that a second paroxysm recurs. The calculus has passed into the bladder, and under favourable circumstances may be ejected through the urethra. If any treatment be required subsequent to the passing away of the symptoms of renal colic, it should be based on the action of alkaline waters lessening, but not entirely neutralising, the acidity of the urine by these means. The carbonate of potash, with a salt of lithia and lemon-juice, should be taken till the acidity of the urine is reduced or moderated. In regard to diet, moderation in nitrogenous food, and the avoidance of all things calculated to derange digestion or impede the functions of the liver are indicated, along with the use of the Carlsbad or the Freiderichshall waters on alternate mornings, or a Hungarian bitter water, the *Hùnyad Janos Bitterquelle* lately introduced, which in some respects is still more effective in these lithæmic disorders. The lighter kind of wines may be taken in moderation: those having a diuretic action should be preferred. Some of the German Rhine wines are very efficacious in this respect. All effervescing wines, champagne, sparkling hock, burgundy, or moselle, should be carefully avoided.

Up to this stage the disease presents a tractable and remediable character. In the first period corresponding to an act of displacement, occasional attacks of hæmaturia have marked the presence of some irritating substance in the kidney. More urgent symptoms of nephralgia followed by renal colic mark its escape from the sulcus of the kidney, and its escape through the urethra may occur with or without symptoms of impaction in

that passage. But there are many cases which do not terminate so favourably. The more formidable results of renal calculus occur in cases in which, with some well-marked typical symptoms of gravel or even calculus, such as hæmaturia, or indeed without any evidence of such pre-existing disorder, the symptoms pass slowly, almost imperceptibly, from the early state of hæmaturia to evidence of the retention of a calculus within the kidney, and a group of symptoms start up which emphatically declare that the next stage of the calculous disease has been reached, and that calculous pyelitis has been established. The signs of this stage are important, and to an experienced observer readily recognised.

The diagnostic symptoms of calculous pyelitis relate almost exclusively to the state of the urine; that is, if to the usual characteristic symptoms of renal calculus there be added certain changes in the physical conditions of the urine following in succession, the sum of these constitute the diagnostic signs of calculous pyelitis. Occasional and successive attacks of hæmaturia suggest the existence of a renal calculus. An increasing amount of a mucous sediment following the susibdence of the hæmorrhagic state, consisting of exudation corpuscles, chiefly mono-nuclear, large in size, being derived from the protective epithelium of the sulcus of the kidney, the infundibulum, and ureters, indicates an irritative action set up in these outlets, and mark the detention of calculous material within these localities. The change to the next or purulent stage is progressive, and is often accompanied by some very marked and characteristic symptoms. The most noted of these consist in certain sympathetic sensations derived from an irritation excited in the renal plexus and transmitted to remoter parts, chiefly through the cutaneous nerves of the hip and thigh. So that aching pains referred to the anterior or posterior crests of the ilium, pain and retraction of one testicle, a peculiar aching sense referred to the extremity of the urethra and leading to frequent micturition, are well-known symptoms. But to these must be added the now altered character of the urine. It now becomes distinctly purulent. It is passed of a creamy or milky aspect; set at rest, it quickly settles into two portions: an upper clear, subacid stratum, and a lower well-defined sediment of pus-

corpuscles. The upper stratum of clear urine is slightly albuminous from the presence of the liquor puris, a serous fluid absolutely necessary to the existence and development of pus cells. The well-defined sediment of these cells, similar to a chemical precipitate, is very characteristic of pus in the urine, and marks at once the distinction between the heavier corpuscles of pus and the lighter mucous or exudation corpuscles, which latter leave no defined upper margin, but seem to float in the lower layer of urine, and by insensible degrees to pass into the fluid above. The more distinctly purulent the urine becomes, the more certain it will be that a renal abscess exists, and with this additional point for detection, the possibility of the formation of a renal tumour. There are some symptoms developed in the progress of these cases which are especially characteristic and diagnostic. A patient passing purulent urine is tormented not so much with pain as with a most distressing frequency of micturition, day and night, but chiefly at night. Every hour, or every half-hour even, the call to pass water is most urgent; but little, however, passes. However small the quantity, there is a temporary lull in the aching at the neck of the bladder or extremity of the meatus urinarius.

It may happen that there is a lull in these symptoms, and the patient is surprised and even comforted by the appearance of urine that is clear and of ordinary appearance: the milkiness is gone. But it is not many hours before this transitory consolation passes away, for a sense of fulness and a dull aching pain is felt in the lumbar space—pain in the ureter of the affected side, described as a sense of cutting, passing from the region of the kidney to the groin, may be very urgent: after the lapse of a few hours or more, the patient observes his urine to be again cloudy and sedimentitious as before, and with this reappearance of pus in the urine, relief to the sense of fulness and weight in the back and loins disappears. After an interval the symptoms repeat themselves: the urine is clear, but the pain in the back returns. After a time this apparent anomaly is mentioned by the patient to his physician or surgeon. A careful examination of the region of the abdomen during one of those intervals in which pus is absent from the urine reveals a tumour more or less elastic to the touch, and

tells plainly the existence of a tumour in connection with the kidney.

The explanation of these seeming anomalies is not difficult. The progress and several stages of the case may be thus summed up:—An early stage in which the symptoms of renal calculus have been more or less marked, passing gradually into the second stage, in which the urine shows a constantly increasing amount of mucus cells with many attendant sympathetic symptoms of irritation within the kidney. There has been no renal colic to indicate the passage of a calculus from the kidney through the ureter; but, on the other hand, daily increasing amount of mucous cells and a progressive increase of symptoms referable to renal irritation.

This stage is essentially that of calculous pyelitis. A calculus too large to escape is lodged within the sulcus of the organ: it slowly but progressively increases in size, at first by layers of its original composition, lithic acid; but usually lithates are added, which accelerates its increase. As the irritation set up increases, and the mucous corpuscles augment, some molecular change in the urine itself is set up; and now layers of triple phosphate, the result of these changes, rapidly enlarge the concretion, and the increase now becomes irregular, and the concretion moulds itself into the cavity in which it is lodged: it becomes branched and irregular, a part moulding itself in the infundibulum, and partially blocking the passage down to the ureter. Other parts more slowly fit themselves into the hollows of the calyces. Up to this point the pressure of the constant flow of urine from the parenchyma of the kidney exercises a sufficient pressure to force the urine, which now, or for some time previously, had become purulent, down through the partially blocked infundibulum. But soon the close impaction of the calculus prevents any pus or urine from passing; for a few hours the urine, secreted by the other kidney usually intact, appears clear, but corresponding with this period is the development of a renal tumour with its accompanying distress and often feverishness, loss of appetite, and general restlessness. So soon as this happens—and this sometimes occurs after a few hours—the increased pressure within the cavity of the kidney forces a passage and evacuates the collected purulent urine with sub-

sidence of the renal tumour. Such is the history of typical cases of calculous pyelitis. But the case does not end here: one of two results takes place, usually in the form of a peri-nephritis. The renal tumour or renal abscess no longer finding release, its constantly accumulating contents may open for themselves a passage in the direction of least resistance, constituting the condition known as peri-nephritis. Many and various are the directions which the suppurative process may take. The simplest and safest is the development of a suppuratory point in the loins, and the contents of the abscess may thus find an outlet without any operation or other surgical aid than may be necessary to facilitate the drain of the urinary abscess.

For the comfort of the patient, if he were under observation at the time, it would be proper, so soon as the characteristic baggy feel with some superficial redness was detected, that an opening should at once be made and the patient placed in such a position as to favour the drain of the renal abscess. Such cases do not terminate unfavourably. The ultimate result is complete destruction of the kidney—the sacculated condition of the organ shrinking and contracting till only a mass of condensed structure is left to mark the site of the destroyed organ. In one instance within the experience of the writer the abscess in the right kidney opened into the ascending colon and discharged its contents as a formidable purulent diarrhœa, the true nature of which was not recognised till the complete disappearance of the renal tumour could be accounted for in no other way. This patient lived for some years in fair health, and was then lost sight of.

A more fatal result of a peri-nephritis is the opening into the cavity of the peritoneum with resulting fatal peritonitis. The commencement of a peri-nephritis is marked by a sharp rigor and feverishness, inappetency, nausea and sometimes retching, rarely vomiting, great restlessness and uneasiness, particularly in the erect posture, and these coincide with the disappearance of pus in the urine. One of the most typical cases within the experience of the writer occurred in the person of a gentleman engaged in business, and who for a year or more had suffered from what by description appeared to be symptoms of renal calculus, followed by those of calculous pyelitis. The

attention of his medical adviser had been called to a constant distressing pain about the posterior crest of the ilium and hip of the right side. The pus in the urine had suddenly ceased: for a few days no particular symptoms followed the disappearance of the pus. A severe attack of rigors, with inappetency, restlessness, and rapid pulse, succeeded; then great irritability of the stomach, and constant nausea, with a sense of fulness and dragging weight in the right lumbar region. The fourth day after the rigors the symmetry of the loins was visibly altered. The right lumbar space bulged out backwards, and extending downwards a distinct fluctuation could be traced, overlapping the brim of the pelvis posteriorly, and reaching downwards almost over the gluteus to the trochanter. Over its whole surface pain was very acute on pressure. The patient could not stand upright from the painful downward drag which this position produced.

An exploratory needle was inserted into the most prominent point of the inferior part of the swelling, and pus being found in the groove, a free opening was made, and more than a quart of a urino-purulent fluid evacuated. Opiates were given for a few nights. The patient quickly recovered his appetite, and after a sojourn of some weeks at the seaside he returned to his ordinary occupation.

The writer heard of this patient some two years after this occurrence, and was told that the urine was perfectly natural. The organism was therefore working with one kidney: the right one, from its probable sacculated state, would collapse and contract, and all trace of excretory or tubular structure would disappear.

It may be desirable to say a few words on the treatment of these cases of calculous pyelitis. They certainly do not afford much hope—and their pathology justifies the unfavourable opinion—that any very great prospect of relief by medicine can be entertained. The possible natural progress of the disease in one or other of the directions just described is the only rational favourable termination. But to expect from the use of internal remedies any change in the urinary symptoms so long as an irritative cause remains present in the kidney, persistently exciting the tissues in which it is embedded, would be to ignore

all that pathology has taught, and would tend to mislead the patient, by creating in him a belief that internal remedies could exert a beneficial effect on his disease.

The infusion of the pareira brava in three or four ounce doses, the infusion of buchu, and the decoction uva ursi, have been severally recommended on the authority of writers who think they have seen remedial effects produced. A somewhat extended experience in these cases does not permit the writer to attribute any great remedial power to their use. They may contribute to allay the anxiety of the patient: they may enable him to feel that something is being done for the relief of his disorder, and if this soothing consolation is really produced, the practitioner may be justified in conniving at a deception which may help to tide over the slow progress of the case, and the long interval which often elapses between the full development of the symptoms of calculous pyelitis and those which justify the hope that the disease is progressing in one of the directions favourable to a spontaneous cure.

The differential diagnosis between calculous pyelitis and tubercular or scrofulous pyelitis will be discussed in a future number, with some observations on cancer or malignant disease of the kidney.

PHYSIOLOGY OF MICTURITION AND RETENTION OF URINE.

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THE physiological questions involved in the discharge of urine from the bladder are of high interest, since they occupy the border land between voluntary and involuntary acts; and at the same time it is reasonable to suppose that an accurate knowledge of the relations of nerve and muscle in this act will have an important influence on our views respecting the pathology and treatment of urinary affections.

It may be regarded as certain that the nervo-muscular arrangements for the due performance of the special functions of the bladder must be of a highly complicated character. It is to be remembered that on the one hand the bladder is capable of retaining for many hours a gradually increasing amount of fluid, without permitting any escape or leakage, whilst on the other it can at any moment, under the influence of the will, be made to discharge its contents, even when these do not exceed a few drops. It need scarcely be stated that it is composed of two muscles opposed in action, the detrusor urinæ, and the sphincter vesicæ, but it is only of late years that evidence has been obtained showing that besides the lower ganglia of the sympathetic cord, which give off branches to, and receive others from the hypogastric plexus, there are at least two centres in the lumbar and sacral regions of the spinal cord, as well as others which are situated in the corpora striata or higher nervous centres, which preside over its action.

The muscular sac of the bladder is essentially composed of three layers of unstriated muscular fibres, lined by mucous membrane, and covered with peritoneum. The fibres of the outer layer are arranged in figure-of-eight loops, those of the

internal one longitudinally, and those of the middle layer are circularly disposed; near the orifice of the urethra the circular fibres become more pronounced, and the layer they thus form has commonly but erroneously been regarded as the true sphincter vesicæ.

The fibres just described may be collectively termed the detrusor urinæ, and their contraction effects the expulsion of the urine from the bladder.

The true sphincter vesicæ surrounds the urethra in the prostatic and membranous part of its course, and consists partly of striated, and partly of unstriated muscular tissue. If successive transverse sections of the prostate be made from behind forwards, it will be found that near the middle of the upper surface of the gland, a few longitudinal striated fibres appear; as the apex of the gland is approached these become more and more marked, and owing to the thinning out of the gland, become more closely approximated to the urethra. In the next sections a few fibres appear below the urethra and in the substance of the gland; and finally, near the apex of the gland, the urethra is surrounded by several interrupted longitudinal layers of striated muscular tissue, known as Guthrie's and Wilson's muscles, which collectively form a constrictor urethræ. The amount of unstriated muscular tissue in and on the prostate gland is very considerable: this tissue forms a tolerably thick investment to the whole gland, and numerous fasciculi and layers, the fibres of which chiefly pursue a circular direction, are found in the substance of the gland itself.

In a healthy animal and in the ordinary conditions of the parts, the escape of the urine which is gradually accumulating in the bladder is prevented by the constriction or closure of the urethra effected by the sphincter vesicæ. The degree of pressure required to overcome this constriction, or, as some have called it, the *tone* of the sphincter, has been determined by several observers. It may be estimated by opening the abdomen, applying a ligature to one ureter, and inserting a cannula into the other. A long glass tube is then attached to the cannula and water poured into its upper orifice till it begins to flow from the urethra. Kupressow,[1] proceeding in this way, finds that a

[1] Pflüger's Archiv, 1872, Bd. v., p. 291.

column of water, sixteen to twenty inches in height, is required to overcome the resistance of the sphincter in the rabbit. That this tone is derived from the spinal cord is shown by the fact that if the spinal cord be divided between the fifth and the seventh lumbar vertebra, the pressure required immediately sinks to five or six inches, which is no higher than that required to force a passage in a dead animal, though of course in the latter case, after the fluid has once begun to flow, no pressure at all is required to cause the discharge to be continuous. Giannuzzi and Nawrocki again found that in a bitch the pressure of a column of water of about thirty inches in height was required to overcome the living contractility of the sphincter, whilst half an hour after section of the vesical nerves the pressure required fell to about eight inches, and was no less after death.

It may be taken for granted, then, that an excito-motor centre exists in the spinal cord. Let us see whether its limits can be in any way determined. The experiment made by Kupressow serves to define its upper limit, for whilst, as above stated, section of the spinal cord at the level of the fifth lumbar vertebra immediately paralysed or destroyed the reflex activity of the sphincter, section at the level of the fourth had no influence in depressing it at all, the column of water required to force a passage being as great as in the uninjured animal.

The same experiment has been performed with the same result by Masius,[1] and by Budge,[2] both of whom observed after section above the fourth lumbar vertebra that the bladder became greatly distended with urine, whilst after section at the fifth or sixth lumbar vertebra, incontinence of urine was established. Budge places the centre, which he calls the *genito-spinal centre*, a little higher, namely, opposite the fourth lumbar vertebra in the dog.[3] Masius places his *ano-spinal centre* at the level of the lower third of the fifth lumbar vertebra.

These experiments may be understood by a reference to Fig. 1, where *a* represents the afferent nerve of the sphincter, and *b* the efferent or motor, S and M being the sensory and motor ganglia respectively. If the section, as in Kupressow's experiment, be

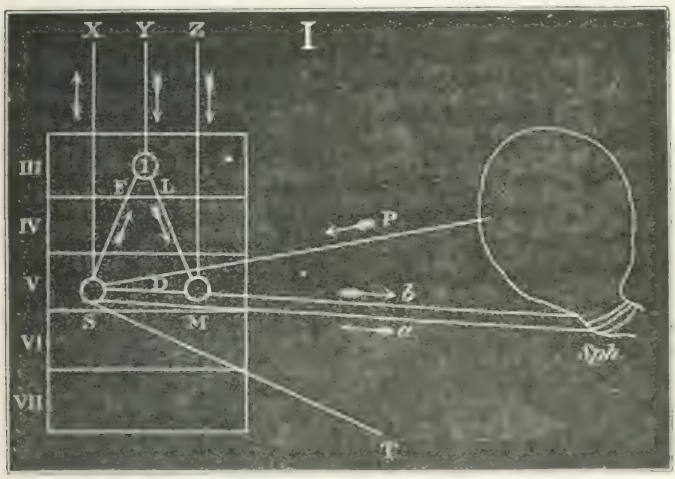
[1] Bulletin de l'Acad. Roy. de Belgique, 1868, p. 491.

[2] Virchow's Archiv, 1858, Band xv. p. 115.

[3] See Budge, "Zur physiologie des Blasenschliessmuskels," Pflüger's Archiv, 1872, Band vi., p. 369.

carried through the cord at the level of the fifth lumbar vertebra (v.), these ganglia will be destroyed and the sphincter (Sph.) will be paralysed, and incontinence of urine will follow. If, however, the section be carried through the level of the fourth lumbar vertebra (iv.), the excito-motor mechanism is untouched, and the sphincter remains permanently contracted, and the bladder consequently becomes distended with fluid.

Though in the accompanying figure the fibres are drawn for the sake of simplicity, as if they passed directly from the cord to the sphincter, it need hardly be said that the nerves issuing from the spinal cord at this point in reality descend for a considerable distance in the sheath of the dura mater, parallel to the cord,



and only emerge as sacral nerves. In accordance with this, Budge found that on excitation of the third and fourth sacral nerves, lively contraction of the constrictor urethræ, or sphincter vesicæ externus of Henle, occurred both in dogs and rabbits, whilst, on the contrary, section of the roots of the third, fourth, and fifth sacral nerves was followed by incontinence of urine, *i.e.*, by paralysis of the sphincter. These are clearly, therefore, the motor nerves of the bladder.

Budge believes that the *sensory* nerves of the bladder, which when excited can produce contraction through the motor fibres contained in the spinal cord, run in the great trunk of the

sympathetic, into which they enter from the plexus hypogastricus, and from which they pass by the rami communicantes into the spinal cord as high as the diaphragm. After division of the third and fourth sacral nerves, no excitation of the sympathetic fibres caused contraction of the bladder, nor after division of these same nerves could contractions be produced on irritation of the upper parts of the spinal cord.

There are still a few remarks to make on the reactions of the genito-spinal centre, after division of the cord in the upper part of the lumbar region.

Budge,[1] in an elaborate series of experiments, set himself to determine what parts of the urinary apparatus when stimulated caused contraction of the sphincter, the occurrence of which he proposed to recognise by an interruption to the flow of water through the urethra. With this object in view he exposed the bladder by opening the abdomen, passed a ligature round one ureter, and inserted into the other a cannula in connection with a long vertical glass tube which was filled with warm water. The height of the column of water was sufficient to overcome the resistance of the sphincter, and a continuous flow took place through the bladder and urethra. Whilst this flow was taking place, Budge applied a stimulus to different parts of the excretory apparatus. He found that any part of the bladder itself could be irritated without causing an interruption to the current; but, on the contrary, that it produced increased flow, whilst as soon as the electrodes passed from the bladder to the urethra, a sudden interruption of the current took place, the stoppage being most sudden and complete when one electrode was applied to the pars membranacea of the urethra. To watch the process more distinctly, he cut away the whole corpus cavernosum penis. As the water flowed freely through the cut orifice of the urethra, the electrodes were applied above and below the pars membranacea, and the flow was seen to be arrested by the sudden approximation of the lips of the orifice. A similar result occurred, though more slowly, when the electrodes were applied above and below the prostate, and the action was less and less intense as the excitation was applied nearer and nearer to the bladder. At the part where the action was most

[1] Zeits. f. rat. Med., Bd. xxi., p. 174; Bd. xxiii., p. 78; and Comptes Rendus, 1864, i., p. 529.

marked, the sphincter contracted so powerfully as to resist the pressure of a column of water nearly four feet in height (120 centimétres).

The existence of an excito-motor centre in the lumbar region of the spinal cord being thus rendered highly probable, we may now consider in what way it can be excited to action.

In the first place, looking at the ordinary sensations that are experienced as the bladder fills, we may conclude that sensory impressions rising gradually in intensity are conveyed (through R) to the sensory ganglia (S), from whence they are reflected (through D) to the motor centre (M), and from thence to the sphincter, causing this to contract more firmly. If the bladder becomes greatly distended, the impression is no longer wholly reflected, but passes onwards and upwards to the brain (through S and along X), and excites conscious uneasiness or pain. If it be desired to retain the water, an impulse is transmitted by motor fibres (through Z) to the motor ganglion (M), and the excito-motor influence (of S) on the sphincter is intensified by the will.

It may be asked what reason is there for admitting the existence of these sensory and motor fibres coursing in the spinal cord between the genito-spinal centre and the brain; and the reply is, first, that our own sensations point to such a connection; and, secondly, that there is very satisfactory experimental evidence on this point, since all observers (Giannuzzi, Budge, Goltz) have found that contractions of the bladder can be produced by stimulation of the inferior cut surface of the spinal cord at any height, and even of the corpora restiformia.

But suppose that, instead of holding the water, it be desired to discharge it; what happens then? The phenomena that are then presented seem to necessitate the admission of an *inhibitory*, restraining or regulating centre, which must be in close proximity with the excito-motor centre, and therefore at the lower part of the spinal cord; for the action of the will in this matter is not, like its operation on voluntary muscles, rapid and instantaneous, but is exerted only after the lapse of a distinct interval, and the result is a *relaxation* of the sphincter. We may conceive this impulse to pass down special fibres (Y) to an inhibitory centre (I), which may either act directly through I on the motor centre (M), or possibly may send branches directly to the sphincter muscles.

But why, it may be asked, is the inhibitory centre to be located in the lumbar region?—why not in the brain?—and the answer is, that in certain experiments of a most instructive nature, made by Goltz on dogs, it was found that, contrary to generally received opinion, an animal whose spinal cord is divided is by no means necessarily made to suffer either retention or incontinence of urine. On the contrary, Goltz found [1] that either of these conditions might be established for a time after section of the cord, apparently from shock; yet that when this shock was recovered from, the animals, *quoad* their urinary apparatus, did not appear to be materially damaged. They could hold their water for several hours, and discharged it in full stream at stated intervals, driving out the final drops by the usual contractions of the accelerator urinæ muscle. Similar phenomena are not unknown in man, after lesion of the spinal cord in the dorsal or upper lumbar regions.

An accidental observation made by Goltz affords additional evidence of the fact. He found, in dogs with divided spinal cords, that on cleansing them with a sponge, each time the wet sponge touched the region of the anus, free micturition occurred. (An impression made at T was conducted through S, or possibly directly to I, and thence down to M, or directly to *Sph.* The fibres through which direct conduction may take place, either upwards to I or downwards from I to *Sph.*, are not indicated in the diagram.)

Hence it would appear that the inhibitory centre, if the existence of such a centre is to be admitted at all, must be situated in the lumbar regions.

It will be observed that the admission of the existence of an inhibitory centre is not absolutely necessary to explain the phenomena, for it might be said that whilst sensory impressions derived from the gradually filling bladder are reflected upon the sphincter, causing it to contract, other impressions, as those from the brain, or as in Goltz's experiment from the region of the anus, may act on the muscular tissue of the bladder itself, and cause it to contract so powerfully as to overcome the contraction of the sphincter. The analogy of the uterus is, however, against this, as well as the knowledge we possess that an orderly sequence in the process of micturition is requisite; so that in

[1] Pflüger's Archiv, 1873, p. 474.

cases of hurry with full bladder, in which we forget as it were to call the inhibitory ganglion into play, the bladder may be felt to contract, and the abdominal muscles may be put into violent action, and yet no water will flow. Yet this again admits of the explanation that in our hurry we direct a powerful impulse to the bladder, and do not discriminate between the bladder itself and the sphincter; both, therefore, contract, and the sphincter being the strongest, the water is retained.

The experiment of Goltz suggests a means of assisting nature in cases of fractured spine, and of avoiding the constant introduction of the catheter when the urine is retained. In such cases it would be well to try the effect of sponging the loins or anal region with cold water, with a view of effecting the discharge of the water, at stated intervals.

Goltz's observation also affords an explanation of cases of incontinence of urine in children from ascarides; the irritation produced by the movements of the worms on the sacral nerves causing discharge during sleep when the influence of the mind is suspended.

It is worthy of note that Wernich[1] has observed that after the employment of ergot the bladder is tensely filled. It has been given by Oppolzer in cases of paralysis of the bladder in typhus, by Clarus for incontinence of urine in children, for weakness of the sphincter in adults, and by Brown-Séquard and others for paralysis of the sphincter in paraplegia.

The incontinence of urine sometimes observed in advanced age may with great probability be referred to deficient energy in the motor ganglia, or perhaps to this cause, combined with progressive enfeeblement of the muscular tissue itself.

The perpetual desire to micturate observed in those who suffer from stone in the bladder, or from inflamed bladder, is readily explained. The exquisitely tender mucous membrane conveys powerful impulses to the sensory ganglia, resulting in violent and almost tetanic contraction of the bladder: whilst at the same time, the painful impression being conducted to the brain, incites it to call into play the inhibitory ganglia, and the sphincter therefore is relaxed and urine is expelled; but in the very act of expulsion the pain is so severe as to cause reflex action upon the sphincter.

[1] Centralblatt, 1875, p. 353.

ON THE EXAMINATION OF PATIENTS SUFFERING FROM EYE-DISEASE.

(Being an extract from a forthcoming volume of "Essays on the Diseases of the Eye.")

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THE transparency of many of the tissues which enter into the formation of the eye, and the accessibility of most of them to various modes of examination, render it easy, generally speaking, for the surgeon to make himself acquainted with the facts of any case of ocular disease or injury which he may be called upon to treat. Even when the condition of superficial parts is such as to conceal the state of those more deeply situated, as when a cataract or a turbid cornea prevents inspection of the retina, or an effusion of blood into the anterior chamber shuts out the iris and the pupil from view, there are still methods of investigation which afford signs as conclusive as any which can usually be obtained with regard to the internal organs of the body. It is therefore necessary, in inquiring into the state of the eye, to utilise in the most complete manner the advantages afforded by its structure and position, and to look at it in such a way, and with such attention and precautions, that nothing which exists shall escape notice. Occasional errors of inference and interpretation must, perhaps, be regarded as inevitable; but an error about a matter of fact can scarcely arise excepting from haste or from carelessness. The first words uttered by the patient, or the first glance at his appearance, will often suffice to guide a skilled observer in the direction of his inquiry,

and to confine it within certain definite issues; but, while skill has yet to be acquired, it is best to follow some settled order of investigation. For this purpose, an anatomical order, proceeding from the superficial to the deeper textures, is perhaps the most convenient which can be followed, and the most likely to ensure that nothing shall escape scrutiny. The eyelids will thus come first under observation. It is manifest that they may depart from the healthy state in many ways, by faulty position, by swelling, by redness, or by the condition of their margins or appendages; and it may be seen at once whether they are apparently normal or the seat of any of the coarse changes thus indicated. Whenever there is any redness or irritation of the surface of the eyeball, it is not enough to note the absence of such coarse changes, but the state of the palpebral margins and of the cilia should also be carefully scrutinised. For this purpose it is best to use a magnifying glass of about two inches focal length; and, with its aid, to look closely at the growth and position of the cilia, moving the eyelid a little away from the globe during the examination, so as to let the light fall at different angles from time to time. In this way it is easy to discover fine semi-transparent ingrowing eyelashes, which it would otherwise be possible to overlook; and in this way I have more than once found a shed eyelash, an extremity of which had been carried into one of the lacrymal puncta, arrested in the canaliculus, and retained there to act as a foreign body of the most vexatious kind, its projecting portion tickling the conjunctiva of the globe incessantly. The margins of the upper lids should be scrutinised in similar fashion; and then the whole surface of the conjunctiva, both palpebral and ocular. In order to examine the conjunctiva of the lower lid, the lid should be drawn firmly down towards the malar bone by the tips of two or three fingers, placed on the skin just above the inferior margin of the orbit. The patient should then look upwards as much as possible, and the lower retro-tarsal fold will be thrown forwards and rendered prominent. In order to see the conjunctiva of the upper lid, a somewhat less simple manœuvre is required; but it is one which is easily learned, and which it is essential to know. The lids being gently closed, the surgeon takes some small slender instrument, a probe, a pen

handle, or an open pencil-case, and places it horizontally along the upper lid, just below the upper margin of the tarsal cartilage; using the right hand for the patient's left eye, and *vice versâ*. A slight pressure against the upper part of the tarsal cartilage throws its lower margin a little forward; and this margin is then seized by the thumb and index of the disengaged hand, which obtain a light but firm hold of the cilia and of the edge of the lid. The surgeon draws the lower part of the eyelid still more forward, and then with a quick movement turns it upwards round the pencil, which is held immoveable, and acts as a fulcrum of rotation. At the moment when the upward turn is given to the lid, the patient should be told to look down; and complete eversion will be obtained. The everted lid may be held by the fore-finger against the upper margin of the orbit, and the pencil gently withdrawn. This little manœuvre takes many words to describe, but it is done in a moment when once a certain knack has been acquired; and this knack consists chiefly in the consentaneous movement of the two hands, and in the selection of the right time for the upward turn. In patients with lax eyelids, either from weak orbicularis muscles, or from the effect of chronic inflammation, eversion of the upper lid may be accomplished by the index finger and thumb of one hand only; the right hand being used for the left eye, and *vice versâ*. The tip of the finger, placed on the lid, causes some projection of its lower margin, which is then seized by the opposition of the thumb, and turned over, the finger itself serving as a fulcrum. The lid being everted, its inner surface must be examined; and it must be borne in mind that foreign bodies are especially apt to lodge on this surface, about a line from the inferior margin of the cartilage. The upper *cul-de-sac* does not admit of being completely everted; although, when the patient looks down, most of it may be brought into view. It is not an uncommon place of retreat for a certain class of foreign bodies, such as fragments of straw, or of the awn of barley; and it may be fully explored by the bent portion of a hair-pin, or by a wire loop set in a handle, such as is commonly used for buttoning gloves. Eversion of the upper lid is never very agreeable to the patient, and it must of course be understood that it need only be practised when

there is some irritation of the surface of the eye, which may be caused by a concealed foreign body, or by the state of the palpebral conjunctiva. The internal surface of the lid is often covered by warty granulations, which are common sources of undue vascular development on the cornea; and in the lower retrotarsal fold we may find granulations of another kind—the so-called "sago grains," which consist mainly of enlarged lymph follicles.

When there is obvious congestion of the ocular surface, the point chiefly needing inquiry is whether this congestion is limited to the conjunctiva, or extends also to the deeper portions of the globe. Active congestion of the conjunctiva is readily produced by trifling causes; and, if these continue in operation, the congestion soon becomes chronic, from mere passive dilatation and loss of tone of the vessels. It may vary in degree, from a mere vascular network, with white interstices, to the production of uniform redness. But congestion limited to the conjunctiva may always be distinguished by the readiness with which the vessels may be temporarily emptied by pressure. If the tip of the index finger is placed against the cutaneous surface of the lower lid, and so used as first to raise it a little towards the cornea and then to make it glide down again over the lower part of the eyeball, the track of digital pressure, if the congestion is only conjunctival, will for a moment be left purely white, quite up to the corneal margin. The vessels refill as the finger passes on, and obliterate its track. But if the congestion extends to deeper parts, as for example in cases of inflammation of the iris or of the ciliary body, it will be visible in the fine vascular zone of the sclerotic, which surrounds the corneal margin, and which remains unaffected by pressure. The vessels are too fine to be individually visible, even when overfilled; but they form around the cornea a pink annulus, which is sometimes visible through the conjunctival vascularity, and sometimes obscured by it, so that it is brought to light by the effect of the pressure, which then leaves a track which is pink near the cornea, and becomes white at some little distance from its margin. There is yet a third form of congestion, which is passive and sub-conjunctival, and dependent upon some impediment to the free exit of venous blood from the interior of

the eye. In this form the surface of the sclerotic is traversed by distended and tortuous veins, full of dark-coloured blood, which may easily be seen to emerge from the eyeball through openings not very distant from the corneal margin, and to pursue their course backwards. They are chiefly met with in chronic cases of increased tension, and are constantly present in fully developed glaucoma.

The examination of the eyelids and of the conjunctival sac having been carried as far as may be necessary, attention should next be given to the cornea. The chief characteristics of this membrane are its uniform transparency, and its smooth reflecting surface, which, as a convex mirror, affords an erect but diminutive image of the objects placed in front of it. In the healthy eye, the transparency of the cornea allows us to see the fibrillation and the colours of the iris with perfect distinctness ; but it does not follow, because these are concealed, or seen only imperfectly, that the transparency of the cornea is impaired. The iris may be veiled by turbidity of the aqueous humour, due to the presence of blood or inflammatory products in the anterior chamber; and we then judge of the condition of the cornea by its smoothness and reflecting power, and by the presence or absence of vessels running upon it from the conjunctiva. On the other hand, when the cornea is itself turbid, the turbidity is seldom uniform over the whole surface, and the more transparent portions will then often allow us to see the condition of the aqueous humour and of the iris.

Slight opacities of the cornea, and even foreign bodies, such as pieces of coal or iron, imbedded in its substance, are liable to escape cursory observation by reason of the direction in which light falls upon them, or because they are like in colour to the background of iris or pupil behind them. There are many affections of the eye which it is well to treat by keeping them in comparative darkness; but there are no in which it is proper to be content with examinations made under the same circumstances. In order to get the best possible view of the cornea, the patient should be seated facing a good large window admitting plenty of diffuse daylight, but not the direct rays of the sun. The eye under inspection should not only be turned successively in various directions, but the surgeon should also

vary his own point of view; and, in a case admitting of any doubt, should employ two convex lenses, one as a "bull's-eye," to concentrate light upon the parts observed, the other as a magnifier, to examine the illuminated surface. Or he may do the same thing by lamp-light, a method which is dignified by the name of "focal illumination," and which is often of the greatest possible value. The sketch in Fig. 1 illustrates the way in which focal illumination is ordinarily practised, and the position

FIG. 1.

of the lamp and lenses. The former is placed somewhat in front of the patient, and at the side of the eye under examination, and by varying its place, or that of the illuminating lens, the beam of concentrated light is made either to play over the surface of the cornea or to penetrate to the parts below. Messrs. Weiss have lately constructed a lamp (shown in section in Fig. 2), which burns benzoline retained by sponge, has its own "bull's-eye" and reflector, and is so small that it may be conveniently carried in the pocket; and this, which may be held in one hand while the magnifying glass is held in the other, will often be found the most convenient method of illumination. Inspection of the cornea may show that some foreign body is embedded in it, or that its surface is more or less cloudy, or irregular in shape.

or ulcerated, or marked by the cicatrices of former ulcers. It may also be the seat of circumscribed abscess, or of diffused suppuration between its laminæ, or it may be traversed by blood-vessels, arranged sometimes as two crescents, encroaching on its upper and lower margins, sometimes in a fasciculus running to some single point, sometimes distributed more or less evenly over its surface. All these are conditions to be examined, and to be carefully noted down as elements in diagnosis and as guides to treatment.

The parts of the eye that come next under examination are the aqueous humour, the pupillary aperture, and the portion of

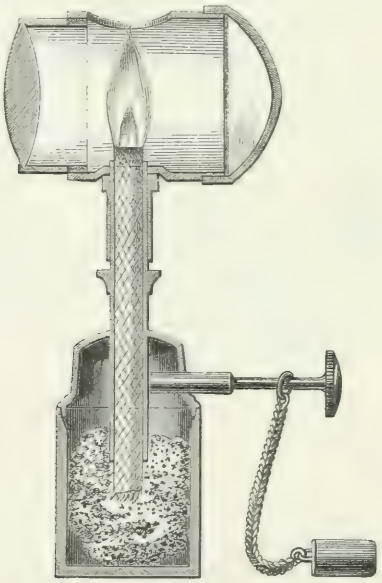

Fig. 2.

the crystalline lens lying immediately behind it. The aqueous humour should be perfectly transparent; but it may be turbid from the presence of early inflammatory products, of pus, or of blood. Inflammatory products may be evenly diffused throughout the fluid; but pus and blood, unless they fill the anterior chamber completely, usually gravitate to its lower portion. In this position pus may be mistaken for a purulent infiltration between the layers of the cornea itself; but such an error would

usually imply a very careless inspection. The upper boundary of an infiltration is, as a rule, irregular, while that of a collection of pus in the chamber is an even horizontal line, which, when the head is inclined to one side, changes its place, in relation to the walls of the chamber, in such a manner as to preserve its original horizontal direction.

When the cornea and the aqueous humour are both transparent they allow the condition of the iris and of its central aperture, the pupil, to be clearly seen. The chief characteristic of the healthy iris is its lustrous striated surface; the chief characteristics of he healthy pupil are its circular outline and its free mobility. If the iris be in the least dull or discoloured, or if the pupil be irregular, or contracted, or sluggish, these are facts on which important inferences may be founded. The lustre of the iris speaks for itself, but the determination of the mobility of the pupil requires care and discrimination. A sluggish pupil will still contract and dilate in unison with its healthy fellow, although not to the same extent; and hence it is necessary to protect from variations of light the eye which is not being examined. For this purpose it should be closed, and the closed lids should be covered by a towel or handkerchief, folded into a sufficient number of layers to exclude light entirely, and applied gently but closely by the hand. The eye under examination should not be touched, but only shaded by the hand of the surgeon, so placed as to exclude light from it as much as possible, and then once and again quickly moved aside while the pupil is steadily watched. In a healthy eye so treated, the pupil rather slowly dilates under the shadow of the hand, and contracts much more quickly when the shadow is withdrawn. The pupil retains a perfectly circular outline while thus changing; and its area, up to the age of about fifty, is of a clear bright black. After fifty, the black is usually exchanged for a more or less grey or yellowish tint. Under the influence of morbid action the iris may be dull, or visibly vascular, or studded by nodules of lymph; and the pupil may be sluggish, or altogether fixed, or irregular in outline, contracting and dilating only at certain parts of its circumference, and its area may be more or less occupied by inflammatory products. For the full determination of some of these conditions, and also in order to inspect the crystalline lens,

it is often necessary to obtain the action of atropine, which should be applied in the form of a perfectly neutral solution of the sulphate, of the strength of about two grains to the ounce of distilled water. The lower eyelid being slightly depressed by the finger, a drop of this solution should be left in the lower retro-tarsal fold, near the outer canthus, by means of a glass dropping tube, or of a quill pen fashioned into a blunt scoop. The patient should be told not to wipe out the drop, but to be content with drying the cheek if any of the solution should trickle down. When the application has been efficiently made, complete dilatation of all the moveable parts of the pupil will be effected in from twenty to thirty minutes; and any adhesions or irregularities of outline will be rendered conspicuous. When the pupil dilates completely, or with a near approach to completeness, it becomes possible by the aid of focal illumination to see deeply into the crystalline lens, and even to recognise morbid growths, or effusions of blood or lymph, lying behind it in the vitreous. Opacities of the lens may generally be made out very clearly, their grey or brown colour contrasting strongly with the natural aspect of the pupil. For the inspection of parts deeper than the iris, focal illumination is at best a method supplementary to the use of the ophthalmoscope, an instrument which is in most cases essential to a complete examination, but which will be made the subject of a separate account, and to which in this place it is unnecessary further to refer. But without the ophthalmoscope it is possible for anyone, who is acquainted with the anatomy of the eye and with the elements of pathology, to make out, by careful looking and by the exercise of common sense, what is the actual condition of all the more superficial parts of the organ.

(To be continued.)

Reviews.

Therapeutics, Materia Medica, and Toxicology, with especial reference to the application of the Physiological Action of Drugs to Clinical Medicine. By H. C. Wood, jun., M.D. 8vo. pp. 578. Philadelphia: J. B. Lippincott and Co. London: Smith, Elder, and Co.

A Handbook of Therapeutics. By Sydney Ringer, M.D. Fourth edition, 8vo. pp. 632. London: H. K. Lewis.

The want of a full account of the physiological action of drugs, in the English language, has hitherto been a serious obstacle in the way of many who, while desirous of studying scientific therapeutics, have been debarred by their insufficient knowledge of German from consulting works in that language. This want is now supplied and the obstacle removed by the work before us; and we warmly congratulate Dr. Wood on the ability, energy, and careful research of which every page in the book bears evidence. In the preface he successfully attacks the old and oft-repeated objection that the results obtained from experiments on the lower animals give no information regarding the action of medicine on man; and, after a short account of the different modes of applying remedies, he proceeds to consider the different drugs in detail. His aim throughout has been to make their physiological action the chief point of discussion, and accordingly his descriptions of their physical characters and reactions are very brief. He classes the remedies together according to their actions, as cardiac stimulants, cardiac sedatives, purgatives, anæsthetics, &c. An account of the general action of each group is given at its commencement, and afterwards follows a description of the action of each member of it. The industry displayed by Dr. Wood in collecting information from every available source is very great, and the references which he constantly gives enable anyone desirous of further information to consult the original papers on the subject without losing time in a search after them. We are sometimes tempted to wish that the experimental results which he details could have been further condensed, as their multiplicity is apt to confuse those who are only beginning to study the subject; but such condensation would, on the other hand, have rendered the work less valuable as a book of reference. The therapeutical uses of remedies are clearly given, though less space is devoted to them than to the physiological actions. The toxicological action of drugs is given, because it is necessary to a

complete knowledge of their physiological action. The chemical detection of poisons, however, is entirely omitted. Altogether this work stands by itself as the only complete treatise on the physiological action of drugs in the English language, and no student of scientific therapeutics should be without it.

Dr. Ringer does not enter so fully into the physiological action, but he devotes more space to the consideration of the therapeutic employment of remedies than Dr. Wood. His work is thus even more useful to practitioners; and the mere fact that another edition has been called for within a year, shows how much it is appreciated. The present edition differs from the last in containing new chapters on phosphorus, croton-chloral, and hamamelis, as well as much additional information regarding several important remedies, as digitalis, belladonna, &c., so that it has increased by more than seventy pages. Notwithstanding this, it still remains a handy book, and we cordially recommend it to every student and practitioner.

Pharmacographia. A History of the principal Drugs of vegetable origin met with in Great Britain and British India. By Friedrich A. Flückiger and Daniel Hanbury, F.R.S. 8vo. pp. 704. London: Macmillan and Co.

Unlike the two already mentioned, this work does not touch at all upon either pharmacy or therapeutics, but is entirely devoted to the history, description, composition, and commercial relations of drugs derived from the vegetable kingdom. By limiting the field of inquiry, the authors have been enabled to give such information regarding those points on which they do touch as is to be found in no other work. Especially is this the case with regard to the botanical origin and history of medicinal plants. On comparing the history of pepper, for example, as given in Pereira's large work on Materia Medica, with that contained in the Pharmacographia, we find that the former is wofully deficient, while the latter is very full and contains much information interesting even to a general reader. Thus we learn that in the middle ages pepper was the most esteemed of all spices, so that ten pounds of pepper formed part of the tribute which the Esterlings, who traded at Billingsgate, were yearly obliged to pay for their privilege. The pepper-corn rents, which have now become merely nominal from the low price of the spice, were at one time by no means inconsiderable, and originated in the desire of the wealthier classes to secure a supply when the market was uncertain. The information given by the authors is in very many instances the result of their own personal investigations, and the fulness and accuracy of their joint production does not disappoint the expectations naturally raised by their high reputation.

Extracts from British and Foreign Journals.

Actions of Jaborandi.—M. Albert Robin reported to the Biological Society of Paris the result of some experiments made by him under Prof. Gubler. A few minutes after swallowing the drug there is a great increase of the lachrymal secretion, followed by salivation and copious perspirations. The secretions of the gastric and respiratory mucous membranes are also increased, and the nasal secretion is so greatly increased as to cause copious expectoration and vomiting where the saliva is also greatly augmented. In experiments upon dogs, the gastric mucous membrane was seen to be congested, and even exhibited small ecchymoses. The intestinal secretion is also increased, and diarrhœa follows. Thermometric observations have shown that in a healthy man the temperature was slightly raised immediately before perspiration occurred. It rises from 1° to 2° C. during the sweating, then returns to the normal standard; and this is followed by a reduction of 1° to 2° C., lasting for a day or two. In cases of articular rheumatism, like phenomena were observed, and the subsequent reduction of temperature was noted. In animals, jaborandi in poisonous dose reduces the temperature until the moment of death. The heart's action is less frequent than natural. Bale and Hardy in their experiments noted diminution in amount of urine; M. Robin never found the quantity of urine appreciably altered. Robin and Gubler found the use of jaborandi in acute articular rheumatism followed by a fall of temperature and by almost absolute disappearance of pain. They recommend its use, cases with valvular lesions being excepted, as jaborandi increases in number the beats of the heart. In acute bronchitis occurring in the emphysematous lung, the mucous secretion was dried up in a single day's use of the drug. In Bright's Disease, a rapid but transient disappearance of œdema and diminution of albuminuria follows its use. (*Le Progrès Médical*, Nov. 21, 1874.)

Poisonous Action of Salts of Nickel and Cobalt.—M. Rabuteau read a paper before the Biological Society of Paris to show that these salts acted as muscular poisons, and their fatal action is by arrest of the cardiac muscular contractions. (*Ibid.*)

Aphonia of eleven years' duration treated by Faradisation.—Dr. Porter, of St. Louis, gives the case of a man, aged 30, who had been well up to the winter of 1862. At this time he was in the army, and being exposed to wet and cold, "caught cold in his throat." Hoarseness followed, and in twenty-four hours his voice was quite gone. His throat felt sore, and he had some difficulty in swallowing, but these symptoms soon passed away. Since that time he had never spoken aloud. He was a strong, well-developed man, without any symptoms of nervousness or debility. Laryngoscopic examination showed that there was slight bilateral paralysis of the adductor muscles of the vocal cords, which was barely sufficient to produce aphonia—the cords moving when phonation was attempted, almost to the median lines, leaving only a narrow space between them. The mucous membrane was of natural colour, and there were no signs of recent inflammation. The case seemed to Dr. Porter in every way a proper one for faradisation, which was applied by means of Stöhrer's induction apparatus and Mackenzie's electrode. The first day the patient was able to make a distinct vocal sound, and after a second application the following day, phonation was completely restored. Since then his voice has remained perfect. Dr. Porter thinks that the aphonia was produced in the first instance by catarrhal congestion, which affected the nervous supply of the adductor muscles of the cords, and after the congestion had disappeared the nerve force was not sufficiently evolved to produce complete approximation. Though the parts had been so long inactive, there does not appear to have been any atrophy of either the cords or of the muscles. (*St. Louis Med. and Surg. Journ.*, Oct. 1874.)

Origin of Schirrus.—S. Wolfberg, of Erlangen, has satisfied himself that schirrus of the breast originates in the epithelium, either of the alveoli of the gland or of the excretory ducts, the former epithelium presenting the glandular, the latter the columnar form. The connective tissue of the gland participates under very various forms in the growth of the tumour, but the endothelium of the lymphatics is not implicated. (*Virchow's Archiv*, Bd. lxi. p. 241.)

Physiological and Therapeutical Action of Phosphate of Lime.—In a little treatise on this subject by M. L. Dusart, whose researches were prosecuted in conjunction with Dr. Blache, the former writer states that he has been led from his experiments to propose the therapeutic employment of this substance under a new and completely assimilable form, that, namely, of the lacto-phosphate of lime. This substance is readily absorbed. M. Dusart enters at considerable length into the distribution of the phosphate of lime in all vegetable and animal kingdoms. From

analyses made of a number of birds and mammals, he finds that, contrary to what might be expected, birds have a larger relative proportion of osseous matter than mammals. Thus, in the live bird 100 parts by weight contain on an average 3·67 of osseous matter, whilst the proportion in mammals is only 2·57. He finds also that there is a remarkable relation between the heat and activity of an animal and the quantity of phosphate of lime it contains. He coincides with Lehmann in believing that phosphate of lime is indispensable for the formation of cells, and he demonstrates that it forms a very large proportion of the ashes of muscle; that it is largely required by the pregnant woman, in whose tissues it is deposited in excess; whilst it is absolutely necessary for the due growth and development of the fœtus. The details of numerous experiments are given, in which guinea-pigs were subjected to fracture of the bones, and then placed on a regimen to which the lactophosphate of lime was added, whilst others similarly injured were not so fed: it was found that the increase in weight of the bones of animals submitted to the lactophosphate of lime regimen exceeded by more than 30 per cent. the weight of the bones of animals submitted to the ordinary regimen. A large number of cases are given in which the lactophosphate of lime was administered in the form of syrup, in doses of one or two drachms, with more or less advantage, in cases of ununited fracture, rickets, scrofula, hydrocephalus, disorders of nutrition during pregnancy, and phthisis. (*Pamphlet.* Paris, 1874.)

Horse-hair for Sutures.—Dr. Fayrer, in his "Clinical Observations in India," observes that a well-selected white hair out of a horse's tail is in many respects better than any suture hitherto devised. That from the tail of a white or grey horse is the best. He cannot tell why it should be so, but he finds the white better than the black hair. The matter, he says, may appear a trifle, but it nevertheless an important trifle, for if the alleged inconvenience and even danger from suppuration from the hemp and silk ligature, or the disadvantages of the wire, can be avoided, the subject is sufficiently interesting to be worthy of consideration. (*Fayrer's "Clinical and Pathological Observations in India."*)

Treatment of Abscess of the Cornea by the application of Friction and the Vapour of Hot Water.—Dr. Osio remarks that in the treatment of some obstinate affections, simple but very efficacious remedies are often despised. Abscess of the cornea may arise from injury or from constitutional disorder usually associated with great debility. In the course of a few days, without pain or lachrymation, and almost without any injection of the tissues of the eye, pus appears in the

lamellæ of the cornea. After a short time it bursts through Descemet's membrane and forms a large hypopyon, often leading to loss of the eye. In such cases Dr. Osio applies the vapour of water, at a temperature of 100° Fahr. or more, directly to the eyes by means of a little apparatus, and then rubs the cornea through the closed lids, with a linen handkerchief, circularly, for one or two minutes. The vapour douche should last for half an hour or more, and the rubbing repeated eight or ten times in that space of time. Then a drop of atropine solution should be instilled, and a compress applied. General sustentation and tonic treatment is also of course necessary. (*Independencia Medica de Barcelona*, 1874.)

Treatment of Bright's Disease.—Dr. Lecorché observes that preventive treatment can rarely be practised; it should consist essentially, however, in the avoidance of exposure to cold, and particularly to moist cold. In regard to curative treatment in the first period, when the inflammatory process betrays itself by diminution in the quantity of urine, by albumen in the urine and casts of the tubes, fibrous cylinders with or without blood-corpuscles, and by well-marked febrile symptoms, the duty of the physician is to arrest this process, to moderate its intensity, to prevent it from extending from one tissue or territory of the kidney to another, since it rarely at the outset invades the whole organ. At this period the antiphlogistic treatment is most effective, and this should consist in either general or local blood-letting and moderate purgation. The former favours absorption in general, and in particular the absorption of the proteic elements, which in consequence of the inflammation are beginning to infiltrate the epithelium. Concurrently with their employment, hot poultices and baths should be used. Purgatives have the same action in lowering arterial pressure, and those that are most serviceable are rhubarb, castor-oil, senna, jalap, and colocynth. Calomel, as it readily excites salivation in nephritic patients, is rarely employed, though it may be used when combined with jalap. M. Lecorché, in opposition to Frerichs, prescribes without hesitation the salts of soda and magnesia as purgatives. The skin may be brought into action by emetics and by antimony; diuretics are rarely of service except when the quantity of water discharged is small. The waters of Vals and Vichy are then useful, with citrate of potash. If these measures prove successful in arresting the progress of the disease in its early stage of hyperæmia, the lumbar pains disappear, the urine recovers its normal characters, and the general tone and strength of the system returns. But if the disease has advanced to the second stage, characterised by albumen in the urine, granular epithelial casts, partial œdema, and congestion

of the pulmonary and intestinal mucous membranes, antiphlogistic treatment must no longer be employed, but reliance must be placed on purgatives and diuretics, both of which diminish the amount of water in the blood, and thus lower its tension and assist the action of the enfeebled heart. Saline purgatives are particularly serviceable, and he has no hesitation in ranging himself on the side of those who use diuretics; and he particularly dwells on the value of digitalis. The skin should also be made to act freely by sudorifics. But these are not the only means of combating the disease in the second stage: the employment of tonic and of ferruginous preparations is strongly indicated by the state of *aglobulie* which characterises the blood. And these constitute also the best means of treatment in the *third* stage, characterised by the waxy casts, fatty cylinders, and diminution of urea, with continued escape of albumen. The patient in this period should be placed under the most favourable conditions of hygiene and alimentation: air and exercise being attended to, and the food given being abundant and nutritious. Quinine may be administered with advantage to promote the appetite. In the last stage, when all traces of inflammatory action have passed away, stimulants and astringents may be used, the latter including gallic acid, alum, ergot, uva ursi, nitric acid, tormentil, &c. M. Lecorché thinks setons, moxas, and cauteries have been too much neglected of late years. (*Bulletin Général de Thérapeutique*, liv. 7, 1874.)

Treatment of Perforating Ulcer of the Stomach.—Dr. Karl Bettelheim recommends the use of morphia in the acute form. In the chronic, he finds the best treatment to consist in giving the stomach as little to do as possible, and in the administration of local astringents. To fulfil the former of these objects, whilst ministering to the nutrition of the patient, he recommends the milk cure and beef-tea, the administration of bismuth, and the use of the nitrate of silver in doses of one-seventh of a grain. When hæmorrhage occurs, he applies six to eight leeches on the pit of the stomach, and the performance of transfusion, of which he has had four successful cases. When perforation is imminent, he gives opium and warns against the use of cold poultices, which augment peristaltic action. He finds the internal use of potassium chlorate very serviceable. (*Pester Med.-Chir. Presse*, vol. ix., and *Med.-Chir. Rundschau*, Sept. 1874.)

[On account of the press of matter, Bibliography and Clinic are unavoidably postponed.—Ed. *Pract.*]

Department of Public Health.

ANOTHER ASPECT OF THE TYNDALL TYPHOID CONTROVERSY.

THERE is a story of a celebrated but waggish French physician to the following effect. In an after-dinner gossip among a group of renowned scientific men, the conversation fell upon the vexations to which each division of the sciences represented was subjected from time to time by the audacious intrusions of the uninitiated within its domains. Instance after instance was cited in illustration, until the stories, had they been collected together, would have formed a "budget of paradoxes" not unworthy of a De Morgan. The physician, the sole representative of medicine present, listened for some time in amused silence to the conversation going on around him, until at length, interrupting, he said: "After all, none of you, nor of the sciences you represent, are in such ill case as physic; for everyone, whether learned or unlearned, initiated or uninitiated, believes himself to be born a doctor." This proposition was met with laughing and eager protests, and presently the conversation was diverted to another subject. The evening wore on, and the conversation referred to had been lost sight of, when suddenly the physician was apparently seized with agonising neuralgia in the face. All crowded in sympathy around his chair, and first one and then another suggested some means of relief. The physicist, the astronomer, the geologist, the chemist, the naturalist, each had his remedy, but none thought of consulting the physician himself, or of sending for another physician. Shortly all had spoken, and the babel of friendly advice ceased, when suddenly the physician's contortions and moans came to

an end, and laughing out loudly, he exclaimed: "Was I not right in saying that every man believed himself to be born a doctor?"

Surely Professor Tyndall, when he put pen to paper to write his notable letter to the *Times* of a few weeks back on "Typhoid Fever," must have done so under the belief that a capacity to understand medicine was in-born. In no other way can we comprehend a man of high scientific training in physics, and an experimental physicist of the greatest note, committing himself unreservedly to a confessedly one-sided view of a recondite etiological question, and (which is of more immediate importance) to the practical teachings arising therefrom. It is not surprising, perhaps, that the learned professor of the Royal Institution, Dr. William Budd's treatise on typhoid fever having come in his way, should have been profoundly impressed with the theory and argument of that distinguished physician. But it is surprising that he should thereupon have assumed professional and public ignorance of the subject.

We do not propose to follow Professor Tyndall in his discussion of Dr. Budd's theory. In other articles will be found a summary of the present state of the question as to the etiology of typhoid fever, founded upon an examination of the subject by Professor Parkes in his Report on Hygiene for 1873, and on Dr. Klein's recent microscopic researches in the pathology of the disease, to which Professor Tyndall referred as confirmatory of Dr. Budd's conclusions. We propose to take the more simple course of showing Professor Tyndall's competency to deal with this subject as regarded from a public rather than a professional point of view. This aspect of the controversy arising out of his letter has not received the attention which it deserves, and yet it is one highly suggestive as to the difficulties which beset sanitary legislation and administration in this country.

Professor Tyndall thinks that the question raised by Dr. Budd is one "sure to occupy the attention of legislators as well as of physicians, and that it is therefore desirable to place it in the clearest untechnical light." This is a sorry compliment to a man whose work, not only as to typhoid fever but also as to cholera, has been familiar to the whole civilised professional world for close upon fifteen years, and has been

incorporated in every text-book of medicine, in this country at least, published during the past ten years. Probably no single individual's scientific labours have exercised so considerable an influence upon the study of the etiology of cholera and typhoid fever, in certainly all English-speaking lands, as Dr. Budd's. It is to the honour of the Commission appointed to inquire into the outbreak of cholera in Northern India in 1861 that it applied to Dr. Budd and obtained from him a valuable memorandum on the etiology of cholera, which is appended to its report, and is published as part of the "Measures for the Prevention of Cholera among European Troops in Northern India," sanctioned by Authority. There is a close correspondence in the essential points between Dr. Budd's conceptions as to the etiology of cholera and the etiology of typhoid fever. Of the latter disease he says, in the memorandum referred to, that he had "taught for many years at the British Medical School the leading doctrines regarding the propagation of typhoid fever, which are enumerated in the series of papers herewith enclosed." Professor Tyndall writes of Mr. Simon, the medical officer, late of the Privy Council, now of the Local Government Board, as his "eminent friend." If he had referred to Mr. Simon's long series of reports, and turned to the appendices containing investigations of local outbreaks of typhoid fever, he would have found there abundant evidence of the great influence Dr. Budd's labours have exercised in promoting etiological research. These labours have, in fact, become so inwoven in medical work, that, except as bare recital of history, Dr. Budd's name is rarely mentioned in conjunction with them, except with respect to the particular theory of successive reproduction which he maintains. One is half inclined to think that Professor Tyndall's impulsive action in this matter (after the manner of M. Jourdain when he discovered that he had been talking prose all his life without knowing it) may have been partly prompted by the new light which had broken upon him when, having read Dr. Budd's work, he found that he had been talking and writing Buddism himself for some time, unaware of the nature and source of the inspiration.

If Professor Tyndall is thus ignorant of the position which Dr. Budd's researches as to typhoid fever occupy in medical

science, it might at least be presumed that he would have had a better acquaintance with the influence exercised by these researches on sanitary legislation. Here there is no special professional knowledge required, no familiarity with medicine, curative or preventive. Here we have to deal with a public question, eagerly and largely discussed in the general press. Yet the discussions in the press and in the Legislature, which culminated in the Sanitary Act of 1866, appear to have passed wholly unobserved by him. Now, that Act contains provisions which enables sanitary authorities to make all arrangements which would be necessary for putting into practice, if they thought fit, Dr. Budd's views as to the prevention of typhoid fever. Professsor Tyndall, writing in 1874, hopes to secure the attention of legislators to a question which the Legislature had settled (thanks chiefly to his friend Mr. Simon), in the sense he would have it settled, eight years before!

Unadvisedly as Professor Tyndall has written of Dr. Budd, this is a small matter when contrasted with his application of Dr. Budd's principles of the prevention of typhoid fever to practice. He accepts and applies Dr. Budd's recommendations as to disinfection as a means of staying outbreaks of typhoid fever without question. Giving one apparently successful illustration from Dr. Budd's own practice, he observes, "Can it be doubted that, with sound medical advisers, backed by an intelligent population, an equally rapid destruction of the foe might be accomplished at Over Darwen?" Not only can it be doubted, but it may be affirmed that the vast accumulation of evidence on this subject since the illustrations given by Dr. Budd are almost wholly adverse to the efficiency of disinfectants under such circumstances. This later evidence is very largely founded upon the experience of typhoid fever in gaols, schools, and other public institutions, where the conditions for using disinfection gave the observations a precision little short of laboratory experiments. Among ordinary communities the use of disinfectants is infinitely more difficult and doubtful; and among communities circumstanced like those of Over Darwen, disinfection, except as ancillary to other more important measures, is a sham. Unless the whole place could be sunk several feet beneath a sea of disinfectant, and whilst there

its filth assiduously stirred up for some time so as to secure the sufficient action of the disinfectant on every part for some time, it is difficult to conceive how disinfection could be applied to it, except in name, on any large scale. Dr. Budd never intended that disinfection should be substituted for other fundamental means of limiting and preventing the spread of typhoid. This attempted substitution, fostered by hosts of patentees, has been a great difficulty in the way of thorough sanitary work; and Professor Tyndall's injudicious and unguarded statement will, we fear, promote this tendency. So serious is the impediment to sound sanitary work, both during and in the intervals of the spread of infectious disease, that the International Sanitary Conference, lately held at Vienna, thought it desirable to put on record a conclusion unanimously arrived at, which, although restricted in words to cholera, applied equally to other infectious diseases, that no chemical disinfectant was known capable of certainly destroying contagion. The Conference, in fact, adopted the conclusions which had before been set forth by Mr. Simon in his well-known "Memorandum on Disinfection," namely: "It is to cleanliness, ventilation, and drainage, and the use of perfectly pure drinking water, that populations ought mainly to look for safety against nuisance and infection. Artificial disinfectants cannot properly supply the place of those essentials; for, except in a small and peculiar class of cases, they are of temporary or imperfect usefulness."

We refrain from pursuing this examination of Professor Tyndall's letter further; but the question still remains—How does it come about that a man of his scientific training should step outside his beaten track, and wander into ways with which he is wholly unacquainted? We can only answer, after the French physician to whom we referred at the commencement of this article, that all people, learned and unlearned alike, apparently believe themselves to be born doctors. Evidently it never entered Professor Tyndall's mind, when he penned his letter on typhoid fever, that the question was one demanding any previous knowledge of the subject, and that it might be at least as recondite as any question he had to deal with in physics.

That Professor Tyndall, the trained physicist, seemingly enter-

tains no higher conception of what is needed in teaching and comprehending etiological and sanitary questions than the man of ordinary education or the altogether unlearned, is a singular but instructive paradox. He hastens, he tells us, to stamp "sanitary truths upon the public mind;" and in so doing, where the so-called truth is not altogether a fiction, he makes it a fallacy. It is this attitude of mind among educated people which makes sound sanitary work and administration so difficult. The counterpart of Professor Tyndall's attitude is found in the evidence of a retired poor-law inspector before the Royal Sanitary Commission. Questioned as to the knowledge, "varied and deep," which he averred to be possessed by a poor-law inspector, he was asked, "You think he would be perfectly competent to advise as to the construction of a system of drainage?" To which he answered, "Yes, I think he could do that." And so, in trusting confidence of their wholesale competency, the supervision of the sanitary organisation and administration of the country was handed over to the poor-law inspectors, with such disastrous results as we know. Professor Tyndall has now added his influence (with what justice we have seen) to support the administrative and popular belief that questions of etiology and sanitary practice are not questions of scientific and practical medicine, but questions of common evidence which need no trained scientific mind either to teach or to understand. This is the aspect of the Tyndall Typhoid Controversy which we wish especially to commend to our readers.

PROFESSOR PARKES ON HYGIENE.

(Second Notice.)

In our first notice of Dr. Parkes's Report on Hygiene for 1873, that portion of it which relates to enteric fever and cholera was simply referred to. We now propose to describe his observations on these two subjects.

Dr. Parkes discusses with some fulness the etiology of enteric fever, examining the views of Dr. Murchison and Dr. William Budd, and giving an abstract of an important debate on the subject in the Medical Society of Munich. This discussion, owing to Professor Tyndall's recent advocacy of Dr. Budd's views in the columns of the *Times*, has an interest by no means limited to the profession. The following extracts will indicate the present state of the question. Dr. Parkes writes :—

"Dr. William Budd is well known as the strong advocate of the view which looks on cases of typhoid fever as caused by continuous development either in or out of the body, so that one case more or less directly derives the disease from a previous one. Dr. Murchison is the principal advocate of the view which considers that cases may arise independently of any prior case, and are caused by 'air or drinking water polluted with the products of putrefying sewage.' While advocating this view, Dr. Murchison expressly admits 'that enteric fever is in some way communicable by the sick to persons in health,' and he thus admits two modes of communication—one, the rarer, in which healthy persons catch typhoid fever in some way from persons ill with that disease ; and secondly, a more common mode, in which persons get the disease because they breathe or swallow particles of putrefying sewage, not derived from persons ill with typhoid fever. To use the common though inaccurate phrase, these cases arise spontaneously.

"In enforcing his view, Dr. Budd describes with most graphic force, from his own experience, the spread of typhoid fever in villages where the previous non-existence of the disease, its introduction at a given date by a person arriving who had the disease, and its subsequent spread, were all perfectly proved. Nothing can be stronger than his facts, but it would have added to his argument had he given short references to the other very numerous cases of this kind, beginning with those collected by Bretonneau more than fifty years ago. These cases are very numerous both in France, Germany, and England ; and, even since Dr. Budd wrote, another instance has been given by Dr. Ballard, the main facts of which may be cited.[1]

[1] "On Enteric Fever in the Village of Combroke (in February 1873)." Report to the Medical Officer of the Local Government Board. Not yet published.

"A row of three cottages, made out of an old farm-house, and under one roof, was inhabited by three families, midway in the little street of the village of Combroke, near Stratford-on-Avon. In these three cottages an outbreak of typhoid fever occurred in February 1873, while all other houses in the village on either side entirely escaped. What was the reason of this attack and of this escape? For many years prior to this outbreak there had been no case of enteric fever in the village, says Dr. Ballard. There must, therefore, have been something very special to cause such a localised outbreak in these three cottages. On Nov. 14 a girl, aged 17, from one of these cottages, went to service in Leamington, to a house where a young lady had just recovered from typhoid fever. On Nov. 25 the girl began to have diarrhœa, and on December 3 had shivering, and went to bed. On December 8, she was removed to her own home at Combroke, with the diagnosis of typhoid fever (confirmed by four medical men), and became convalescent in about three weeks after her return home. All her evacuations were thrown into an ash-pit privy common to two of the cottages; her soiled linen was washed by her mother, and the water was emptied into a grating in the yard. The family in this cottage consisted (in addition to this girl) of nine persons, of whom four were at home at the time: three came home in March, and two others were occasionally at home. There was also a nurse in the house in March who was not attacked. Now, of these nine persons, no less than seven were attacked with typhoid fever in February and March, and the two who were not attacked were those who were there for a short time. In the next cottage, which used the same privy, there was a family of nine, of whom three got fever. In the third cottage (where there was a separate privy) there were two cases, and both were mild. Dr. Ballard enters minutely into the question of whether the air or the water was the medium of communication, but this point is foreign to my purpose. No other cases occurred in the village. Now, can anyone shut his eyes to the force, positive and negative, of this evidence? Is there any link wanting, or any shade of doubt resting on any part of this history? Then multiply this instance by scores of similar cases, and we form an idea of the position taken up by those who adopt, like Dr. Budd, the view of continuous succession.

"It must be candidly stated, also, that Dr. Murchison has not presented this side of the argument with sufficient detail. He cites only six cases of typhoid fever introduced into a locality previously free and then spreading; and he admits, as already said, from those six cases the occasional communicability of the disease. But, on such a point, it would have been surely better to have cited more of the published evidence of communicability; by not doing so, it looks as if the instances were very few and very rare, which is really not the case.

"This positive evidence is Budd's first position. His second is a negative argument. If putrefying sewage produces the disease, how is it, he asks, 'when the pythogenic compounds are rife,' there is often no fever born of this putrescence; sewage emanations are inhaled for years in some places, and give rise to no typhoid fever? He develops this at some length, and with his usual cogency and felicity of style.

"His third argument is of another kind; it is, that he has always arrested the disease from spreading in houses, schools, communities, by thorough disinfection of the typhoid discharges. This argument, as based on a smaller number of facts, is, of course, less cogent than the others.

"I will now turn to Dr. Murchison's method of dealing with the evidence. The points which seem to have chiefly impressed him appear to me to be two:—
1. The great number of cases which seem to occur altogether independently of

other cases. While the entrance of some putrefying substance is nearly always easy to be proved, a descent from a previous patient seems impossible, for in many cases not a particle of evidence can be found to favour this idea of derivation from another case. 2. The other point is the number of cases in which persons ill with the disease do not communicate it to others; from whom, in fact, there is no further spread.

"Dr. Budd does not seem to me to have dealt with these two great difficulties with sufficient care. He is so impressed with the ease of tracing the communication in small country villages, and the difficulty of tracing it in towns, that the weight of such negative evidence seems to him immaterial. In addition, his mind is of that order which refuses to credit two different origins for the same specific agent, and the undeniable facts of contagion completely override what seems to him the much looser evidence of independent origin. That the evidence is loose in many cases must be admitted. Murchison gives seventeen cases in which the fever apparently originated from bad drainage, while the introduction of an agent from without seemed excluded, and of course these are intended to be indisputable cases. But most certainly in some of these the evidence ought not to be accepted."

Dr. Parkes examines in some detail Dr. Murchison's instances, and then concludes by expressing the opinion that neither the views of Budd nor of Murchison can be regarded as wholly proven, and that in our present state of knowledge, each must be accepted as limiting the conclusions of the other.

The same conclusion follows from an examination of the state of German medical opinion on the subject, as shown by the debate in the Medical Society of Munich to which reference has been made. Dr. Parkes's summary of this debate is so full of instruction that we reproduce it. It proves how surely medical opinion in Germany is approaching the same conclusions on the conditions of development and dissemination of enteric fever as obtain in this country:—

"Dr. Joseph Wolfsteiner, who opened the debate, made a very vigorous attack upon Pettenkofer's ground-water theory, to which he gives not the least assent. He looks at enteric fever precisely as Budd does; it is for him a transportable and contagious disease, and he cites a very good example of its spread in a country place. A Jewish trader went from Munich to a village called Thalmässing when ill with typhoid fever; shortly afterwards a part of his family fell ill with typhoid, and then it attacked many, but chiefly Jewish families which had much intercourse from social and trading connections. From Thalmässing the disease was carried to the village of Tiefenbach, three miles off, and then prevailed there; a peasant's son in service at Tiefenbach went to his own village of Ebenricht, six miles from Tiefenbach; he fell ill there with typhoid, and then his family, partly at the same time, partly after him, took the disease. Previously there had been no typhoid in these villages or the neighbouring, and Wolfsteiner was able to trace all cases back to the imported case.

"In a subsequent discussion, Professor H. Ranke narrated a case which is so

precisely like that already given from Ballard, that it may be quoted. A young woman, who had lived in Munich for two years, got typhoid, and went to her own home at Pahl at the end of June 1871. On the 10th of August her father fell sick with typhoid, and a brother, 10 years old, and both died; on the 23rd of August the mother fell sick, and then two sisters, all with typhoid; in the beginning of September another child fell ill, and the other remaining was also attacked with great diarrhœa and prostration. Except in this family no other case occurred in the village.

"This instance resembles almost all the others now recorded, in the localisation of the disease, and in the first local cases occurring a month or six weeks after the imported case has arrived.

"Besides upholding the transportable and, so to speak, the contagious nature of typhoid, Wolfsteiner strongly advocates its occasional spread through drinking-water, and he cites some remarkable instances of the diminution of typhoid when pure drinking water has been supplied. Pettenkofer replied with his accustomed energy to this attack, and arrayed again the facts and the mathematical conclusions of Seidel, in the years 1856 to 1864, on the coincidences of the ground-water movements and typhoid prevalence. He mentions also that on extending his calculations over the years 1865 to 1873, Seidel found still the same result, viz., that it is 36,000 to 1 that the agreement between the curves of the ground-water and typhoid mortality is not an accident.[1] The carriage of typhoid fever from place to place, *i.e.* its transportability, is freely admitted by Pettenkofer: only he considers it not as a contagium (*i.e.* a substance increasing only in the bodies of men), but as a miasma, *i.e.* an agency which may adhere to clothes or men, but increases independently of them. In other words, man carries, but the locality brings forth; that is, as far as I can see, Pettenkofer's view both of typhoid fever and cholera.

"This reply of Pettenkofer brought forth an answer from Wolfsteiner, and this again elicited an answer from Buhl and another from Pettenkofer, to which Wolfsteiner once more replies. It would demand too much time to go through the arguments, which indeed turn very much on the points already noticed in speaking of the English books.[2]

"I pass on to notice the dissertations of Professors v. Gietl and H. Ranke. The

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[1] In reference to the apparently undoubted influence of the sinking of the ground-water and the attacks of typhoid in Munich, and the want of evidence of the kind in many other places, there is one peculiarity of house construction in Munich which may have an influence in drawing air from great depths. The sewers carry away only house water for the most part. The houses, which are very large, have cesspools beneath, which are emptied by a hose and steam-engine from time to time; these cesspools are, in many cases, no cemented; and Wolfsteiner mentions that he inhabits a house with many inhabitants, and calculates that yearly 35 tons (English) pass into the cesspool under the house; yet in twenty years hardly 25 tons have been removed, so that in twenty years 675 tons of excrement have soaked into the ground. Now, in Munich the warm houses help to draw the cesspool air into the rooms, and as the streets of Munich are beautifully paved, and no gas can escape through them, the cesspools and houses must be the only ventilating shafts for the soil-air.

[2] It may be noticed that Pettenkofer, in referring to Bryden's statistics of cholera in India, and basing on them an opinion that the European race is more subject to cholera than the Sepoys, has fallen into an error, from taking only the

former is well known for his publications on typhoid, and in this debate he repeated his conclusions; for him 'enteric typhus' is a specific 'putrid intoxication;' its local action is a catarrh of the alimentary canal; its specific action is on the intestinal and mesenteric glands; it is a poison disease; the evacuations are the bearers of this poison, and may certainly carry the disease (and on this point he refers to his former evidence); the activity of the poison is very durable; in great cities it is impossible to trace the communication; in the country this can generally be done. Hence, in towns medical men deny the contagious properties of enteric fever, in the country admit them; the experience of many years has convinced him that the poison bearer must be a minute colourless body, perhaps a fungus or spore, which is everywhere deposited and continues long to live, for some barracks and large houses or even some rooms are specially liable to cause attacks.

"These opinions of Von Gietl seem almost identical with those of Budd.

"Professor H. Ranke debated with great care the question of the contagion of typhoid; he cites authorities and examples, and narrates some of his own experience, of which part has been already quoted. He does not doubt the introduction into a place by typhoid patients, and he shows very well that the discussion, whether this is by a 'contagium' or a 'miasma' (to take Pettenkofer's definition), is useless. These terms are for him mere conceptions or formulæ which are used for want of better. Yet he also firmly believes that typhoid can arise spontaneously, *i.e.* when no importation or introduction can be proved; when it thus arises it is from putrid substances; either in the ground and giving off emanations, or in drinking-water, or (as in the case of Audelfingen in the Canton Zürich), which Griesinger describes, through decomposing food. While fully believing in the occasional water carriage,[1] he brings strong evidence against the universality of this mode of spread, and thinks it spreads much oftener through the air. As to the relation of ground-water changes and typhoid, he does not doubt the connection, but he does not quite see the reason of the connection; he inclines to the belief that the rise of the ground-water simply covers the effluvia-producing strata, but he questions whether there is not something peculiar in the soil, and he refers to observations which show that the fine sand lying between the coarser gravel in the Munich soil has an extraordinary power of holding fast nitrogenous substances; cold and even boiling water dissolves very little of the substances from the sand, but the water when evaporated has a disagreeable smell, like putrid glue. To these semi-putrid substances Ranke attributes much influence, and he mentions the remarkable fact that in the neighbourhood of Munich (with the same soil, and of course rise and fall of ground-water) there is no typhoid except what is imported from Munich, and at no time have great epidemics prevailed, but merely 'house epidemics.' What is the cause of this difference? Simply that the soil of these districts, otherwise similar to that of Munich, differs in having no fæcal or putrid contamination of the ground.

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statistics of the Upper Provinces, where the Europeans have suffered from some cause much more than the Sepoys. But the experience of Bengal proper and of Madras shows that this was not owing to race.

[1] The view that typhoid can spread through drinking water is rapidly gaining ground in Germany. Biermer, from an analysis of more than 1,300 cases, cites evidence of water carriage (*Schmidt's Jahrb.*, 1873, No. 8, p. 195); and Geissler quotes from Häglei an extremely strong case of the spread through drinking water (*Schmidt's Jahrb.*, 1874, No. 2, p. 185).

"The last paper in this interesting debate was by Dr. Friedrich, who related some valuable evidence of the villages and districts round Munich. In several of these there is no typhoid; when it is imported it does not spread, or not beyond the house into which the case is brought; also the same places remained free from cholera in cholera years; after giving very full details, Friedrich comes to the following conclusions:

"1. It may be said with certainty that a chain of typhoid cases would not have arisen if no typhoid case had come into the house.

"2. It may also be said that a chain of typhoid cases may arise, without any of the sick having been in communication with a typhoid case.

"The meaning of these two conclusions appears to be that while in some of these house-outbreaks the channel of introduction is evident, and it is certain that had not that channel existed no typhoid would have occurred, there are yet other outbreaks where no such channel can be proved.

"3. Typhoid fever brought into a place can only be spread at certain times and under certain local conditions.

"It will be seen from this short account of this able debate that the question of typhoid is in Munich pretty much in the same state as in England. The view that the disease arises from a specific agent, that this agent is transportable, is admitted; that it can arise spontaneously (*i.e.* not derived from previous cases) is held by some; that it is truly contagious by others; that it spreads through the air by almost all; that it spreads through water and food by many, but not by all; that it is influenced by, and perhaps generated in the ground, and is greatly affected by the movements of the ground-water is generally but not universally admitted. There is, therefore, in both countries many points of common belief; and, as the matters are now clearly defined, it seems possible that we may soon acquire more definite knowledge on the questions which are still under discussion."

In respect to cholera, Dr. Parkes first briefly refers to its recent prevalence in Europe, postponing a full discussion of this prevalence until his next report. The following passing remark deserves quotation in connection with the preceding foot-note:—"The continued prevalence of the disease in Munich is interesting when compared with the condition of the soil and cesspools described (see foot-note), and it really looks as if these conditions, combined with a water-supply tolerably safe from cholera impregnation, would explain both the persistency and the comparative want of large outbreaks."

Dr. Parkes next proceeds to examine the extraordinary propositions advanced by Dr. J. M. Cuningham, the Sanitary Commissioner with the Government of India, in his Ninth Report. This gentleman, our readers will remember, as the result of his long experience of cholera in India, and especially of an investigation of numerous outbreaks made in 1872, has, as to the etiology of the disease, come to the conclusion (to use

Dr. Parkes's words), "that we have been on the wrong track; that we know nothing, and must begin again as if no observation had ever yet been made." Dr. Parkes justly describes this conclusion as one "which common sense revolts at," and which "certainly cannot be established without much more evidence than is found in this (Ninth) Report." Dr. Parkes indicates the weakness of the evidence advanced by Dr. Cuningham in upport of his views, although his report may re-open the question of the transmission of the disease by man. He further thinks that Dr. Cuningham has brought forward an aspect of cholera outbreaks often in danger of being forgotten. For example: "It enters a place in Upper India in successive epidemics almost to a day; or sometimes leaves off almost to a day; it enters a place and does not spread. In another place, apparently similar, it spreads rapidly; it drops here and there in one town so capriciously as to seem trackless; in another it attacks in successive epidemics the same street or even house. With his vast experience of cholera, Dr. Cuningham feels so sure that something yet unfathomed must account for all these caprices, as they seem, that the doctrine of transportability appears to him hopelessly feeble."

Those who are familiar with the early history of cholera in this country will recognise the ring of the old statements which used to be in vogue about the mystery attaching to the movements of cholera, and they will know how this mystery has steadily passed away as it has become possible to submit facts to a more stringent examination. What is peculiarly noticeable in Dr. Cuningham's report is the singular looseness of the evidence upon which he founds his statements respecting the phenomena thus brought together.[1] Dr. Parkes observes on this question: "If transportability be true, as I conceive, that is surely the point to start from; for, if correct, it brings us in presence of a material something the changes and development of which we cannot but hope will be discovered by perseverance and skill."

[1] In the discussion at the Royal Medico-Chirurgical Society, Dr. Cuningham claimed for his investigations equal value with investigations made among populations among whom all facts relating to cholera were known; while at the same time he frankly admitted that nothing was practically known of the disease among the native population of India. Is not this the secret of his conclusions?

Dr. Parkes in the third place describes the result of a series of experiments made by Professor Högges, of Pesth, during the prevalence of cholera there in 1873, on the effects of choleraic evacuations on animals. The animals experimented on were dogs and rabbits, in whom gastro-intestinal catarrh had been previously produced and then allowed to subside. The discharges were used one to one-and-a-half hours after being passed. When the discharges were not first disinfected, their introduction, both by injection and through the agency of a stream of air, produced injurious effects, namely, an inflammatory change in the stomach and intestinal tract. Carbolic acid destroyed this power.

Dr. Parkes refers also to certain experiments with choleraic evacuations on white mice, by Professor Ranke. He found that filtering-paper, even unsoiled with discharges, produced injurious effects on the mice. As filtering-paper was used both by Thiersch and Sanderson in their experiments, Dr. Parkes suggests that this may account for the difference in results. But in this case the action of the filtering-paper would appear to be governed by the state of temperature; for in Sanderson's experiments, while the soaked filtering-paper was very injurious with a mean temperature of 55·9°, it was wholly unmischievous with a mean temperature of 49·0°.

Dr. Parkes quotes some instructive facts bearing upon the water-carriage of cholera, of which the following may be quoted:—

"In Silesia (states Professor Förster, of Breslau [1] are many places which are cholera-free; if introduced the disease does not spread. Förster has examined into the conditions of these villages, and finds only one character; in all these cholera-free places the water cannot be contaminated, being led from a distance, or otherwise safe from impurities. He describes five towns of from 5,000 to 12,000 inhabitants, which have remained free under these conditions of water, though some are low, marshy and crowded; and the disease has been introduced. He then describes a town (Glogau) with 13,000 inhabitants, half of whom have a water supply from a distance; the rest use wells. The former remained free, the latter were severely attacked. In another cholera-free place (Jauer) the water is not taken from a distance but from wells sunk in the rocks, and cannot be contaminated by soakage. He then describes three other cholera-free places where the water must be pure.

"In reference to the possibility of wells being infected by cesspools, he cites

[1] "Die Verbreitung der Cholera durch die Brunnen." Von Dr. R. Förster. Breslau, 1873.

evidence that wells from 50 to 200 feet away were influenced by soakage in porous ground, and perhaps even further.

"He relates a striking case in Breslau of the contamination of a well during the prevalence of cholera in 1866, and the immediate outbreak among eleven people in the house supplied by the water, and concludes his very striking series of facts with two recommendations which, if carried into effect, will, he thinks, prevent cholera from ever being epidemic :—

"1. Lead to every town, even if at great cost, abundant and pure water, as indeed was done, he says, much better 2,000 years ago than now.

"2. Protect the ground from contamination in any way from excrements, and banish all cesspits. The ground must be absolutely pure, and this can only be if all fæcal matter is removed to a distance.

"Were these two recommendations carried out everywhere, perhaps the investigation of cholera would come to an end from lack of material.

"An instance in which the substitution of abundant pure, for contaminated, water supply seemed to produce in two ways an almost complete immunity from cholera, is given by Sernon.[1] Dantzic is a city which in all former epidemics of cholera, has been heavily smitten, in common with Königsberg. In 1871 the cholera spread from Russia, and as usual entered Königsberg, where from the time of the importation (*Einschleppung*) of the first case on the 26th of July to the 14th of October, 2,880 persons were attacked and 1,568 died. Now, as in the former epidemic Dantzic lost almost as many as Königsberg, great fears were entertained that the same result would also now follow. But, on the contrary, although the disease was imported into Dantzic several times, there were, from the 1st of August (date of importation) to the 3rd of October (date of last case), only sixty cases and forty-six deaths out of 90,000 inhabitants. What, then, was the cause of this immunity? Two great sanitary works had been going on in Dantzic: great drainage works, planned by Mr. Baldwin Latham, had been nearly but not quite completed when the cholera appeared. Although these new sewers had not been used, and therefore could have had so far no effect, they had had one influence; they had dried the soil, and greatly lowered the level of the ground-water, as was proved by measurements. The soil was, therefore, in the exact condition when, according to Pettenkofer, it should have aided the outbreak of cholera. Yet it did not do so. As Sernon says, there were given 'all conditions for Pettenkofer's Y, and as there was no want of X, it was feared that an outbreak of the worst kind would take place in this town notorious for the prevalence of cholera. But it was otherwise. An epidemic so unimportant that it could hardly be called one, formed a contrast to the Königsberg, as to all former Dantzic, epidemics. We obtained thus a new argument against the general applicability of Pettenkofer's doctrine, which was also strengthened by the later direct water-level measurement.' (P. 131.) The second sanitary work was the supply of extremely pure water, which had been completed and was in use at the time. Was this the preservative agency? To us in England it will appear extremely probable, and Sernon asserts this to a certain extent. Yet he hesitates to ascribe it only to this, as it seemed as if the cholera had, during 1871, less tendency to spread and develop than usual, and, in addition, the abundant supply of water permitted a constant washing out of the old sewers, and instead of the former sprinkling with solution of sulphate of iron, the abundance of water permitted hydrants also to be placed for flushing as well. To this Sernon thinks much influence may have been due, and certainly the drinking

[1] "Deutsche Vierteljahrsch. für off. Gesundheitsff," Band iv. p. 169.

of pure water, and the purification of the surface and of the drains by its abundant supply, are more reasonable explanations of the non-prevalence of cholera than the assumption that the agent had lost the power of spread. It had, in fact, prevailed heavily in the very vicinity of Dantzic, and we ought, therefore, to be careful in falling back on what is a mere assumption."

Finally, Dr. Parkes closes his observations on cholera by a brief account of certain microscopic researches of Professor Eberth, of Zurich, on the blood and discharges in the disease.

HOSPITALS FOR CONTAGIOUS DISEASES.

THE question which has recently agitated North-west London regarding the hospital for contagious diseases, of the Metropolitan Asylum Board, at Hampstead, is one which had previously disturbed several communities in the country. It is a question of growing interest, and for this reason, as well as on account of its intrinsic character, it is desirable to have a clear comprehension of it. We are at one with the memorialists against the Hampstead Hospital in regretting that it should have been placed where it is. The surroundings of the hospital ought to have forbidden such a selection of site, unless there were the strictest necessity for it. It is undesirable, to say the least, that large infectious disease hospitals should be placed contiguous to great thoroughfares and adjacent to property which must undergo permanent deterioration from its proximity. We are not prepared to say that the necessity did not exist, and, indeed, it must be assumed that the Poor Law Board in originally authorising the site, and the Local Government Board in confirming the decision of the previous Board, were satisfied on this point. When we come to regard the strictly medical aspect of the question, that is to say, the probability of dissemination of contagion from an hospital of this kind to the surrounding neighbourhood, it is with some surprise that we find the memorialists wholly failed to establish such dissemination. It is true that they made many assertions, but these were so vague, so unsupported with precise data, as to form a remarkable contrast with the precision of the data which the President of the

Local Government Board had at his command at the interview he gave to the memorialists. It must be remembered that when the hospital was opened for small-pox in 1870 (the building as it then stood having been previously used for relapsing fever), the stress upon its accommodation was very great, and that there was a short period when the want of regulation of the vehicles bringing cases to it, as they approached the entry, gave unusual facilities for the transmission of the disease in the immediate neighbourhood. It was reasonable to anticipate that some cases of infection caught under these circumstances would have been forthcoming, but such was not the case. Notwithstanding the long period of time which the memorialists have had to obtain and produce evidence of infection in this or any other way, they signally failed to do so; and the only precise knowledge of the cases of small-pox which had occurred in the neighbourhood of the hospital is seemingly that which the President of the Local Government Board had. It is noteworthy of this knowledge that it would appear that the responsible Government officials, as well as the officials of the Metropolitan Asylum Board, seem to have had a lively apprehension of the evil influence upon neighbouring residences, with reference to infection, which might be assigned to the hospital; and that accordingly they had from the beginning kept a very careful account and made careful examination of cases of asserted infection from it. Hence their evidence, as stated by Mr. Sclater-Booth, is of great moment in dealing with the question we have to consider.

Evidence of dissemination of infection from the hospital failing, the only reason which would necessarily have made it incumbent upon the Metropolitan Asylum Board to give up the site, or upon the Local Government Board to interpose a veto upon the building of a permanent hospital there, failed also.

So far as we can interpret the action of the Government in respect to the prevention of infection and the establishment of infectious disease hospitals by sanitary authorities since the passing of the Sanitary Act 1866, it would seem to aim at the apparently incongruous results of extending the practical application of the doctrine of infection to the utmost, while at the same time disabusing people of exaggerated fears with regard to

infection. This, at least, is how we read the provisions of the Sanitary Act as to infection and as to hospitals in the light of the different memoranda issued by the Medical Department of the Government. Thus, while the isolation of infectious cases and all the details of disinfection are urged on the one hand, on the other, no particular importance is apparently attached to the position of the public accommodation for isolation. If sufficient space for rapid temporary extensions in times of epidemics is furnished, dangerous length of removal for patients is not involved in its situation, and the rudimentary rules of wholesomeness of site are not sinned against, it appears to be assumed that the infectious disease hospital may be located anywhere in the vicinity of houses without danger to the neighbourhood from the accumulation of cases, provided the well-known regulations of such an hospital as to structure and management are attended to.

The argument in support of this position is not difficult to understand. The infections of the different infectious diseases are no longer regarded as occult somethings having illimitable and undefinable powers of mischief. They are now known to be definite entities having very precise conditions of activity, and that these conditions can be so governed as to reduce the mischievousness of the infections to the very lowest point, and in certain states set it aside almost altogether. No means of guarding against the conditions under which infections become most actively spreading, except in the case of the special protection of vaccination against small-pox, at all approaches isolation in an hospital properly constructed and governed for the purpose. Here that large danger from incidental communications which besets the treatment of infectious diseases in private houses, particularly among the poorer classes, is removed; as also that hardly less danger of conveying infection broadcast by clothing saturated with infection from the exposure to it in confined and imperfectly aërated places. Few things are more remarkable than the want of evidence of carriage of infection from infectious disease hospitals by the friends and relations who have visited the sick lying there. The public do not fully understand that the chances of such carriage, from a well-ordered hospital, are well-nigh inappreciable; while such chances

constitute a principal danger to a community from the treatment of infectious cases in the confined rooms in which the poorer classes are usually housed. Most assuring testimony to the accuracy of these views it would now appear is furnished by the Hampstead Hospital. Notwithstanding that no less than 7,000 and odd cases of small-pox were treated in that hospital during the few months it was in use in the epidemic of 1870–71, it has not been found possible to substantiate any of the charges against it as a source of infection to neighbouring houses, and all the evidence goes fully to acquit the hospital of having been such a source. On the other hand, the cases of alleged infection from the hospital, it would appear, had originated either in a spread of small-pox in the neighbourhood, which, beginning before the hospital was opened, had extended to adjoining districts from the then want of hospital accommodation for isolation of cases, and consequent inability to remove the particular sources of diffusion to which we have referred; or from contraction of the disease elsewhere in the metropolis. No suspicion, moreover, has arisen of any dissemination of the disease, during the same epidemic, from the other small-pox hospitals of the Metropolitian Asylum Board at Stockwell and Homerton, although 9,000 cases were treated in them. The history of the small-pox hospital at Holloway, both in its previous position at King's Cross and its present position, lends no support whatever to the belief that the accumulation of cases in hospitals is a source of danger to neighbouring houses.

These facts prove that such alarms as have recently possessed the inhabitants of Hampstead, and which have impeded the establishment of infectious disease hospitals in Birmingham (*Practitioner*, October 1874), are groundless; and a consideration of them as well as of the facts given in the number of the journal just referred to, on the influence of hospital accommodation in checking infectious diseases, should make it clear that a principal protection against the spread of such diseases must be the multiplication of hospitals for their isolation and treatment in conveniently accessible localities.

THE PRACTITIONER.

MARCH, 1875.

Original Communications.

THE TREATMENT OF DIARRHŒA.

BY DAVID YOUNG, M.D., FLORENCE.

The excellent practical contribution to the treatment of typhoid fever, in the January number of the *Practitioner*, by so experienced an observer as Dr. George Johnson, cannot be too widely read or too carefully considered by the members of our profession. That much harm has been done by "meddlesome medicine," as by "meddlesome midwifery," few will deny. Probably in the whole range of medical practice this remark is in no case more applicable than to the treatment of the diarrhœa of typhoid fever. One of the gravest symptoms of that formidable disease indicating by its frequency and continuance the severity and danger of the attack, its treatment cannot be lightly passed over. Dr. Johnson's plan of *non-interference*, his careful dieting and nursing, and his success, are subjects of the deepest importance in relation to typhoid fever.

For some time I have discontinued the use of the mineral acids, catechu, bismuth, sugar of lead, and other ordinary diarrhœtic medicines, not only in the diarrhœa of typhoid but in every other form of diarrhœa, and have trusted almost entirely to diet and one or two forms of castor-oil emulsion. In Italy

acute diarrhœa is one of the commonest affections the physician has to treat. During three years I have made notes of upwards of a hundred cases in patients ranging from three months to seventy years of age, and in more than nine-tenths of the whole no medicine was used but the emulsion. The following cases will best illustrate the treatment.

I.—L. H., aged 37. Was seized with diarrhœa and vomiting about 3 P.M. Took ten drops of laudanum and brandy twice, and felt better for two or three hours. About 8 P.M. the diarrhœa returned, and was accompanied by severe griping and tenesmus. During the night was up thirteen times. I was requested to see her at 9 A.M. Found her complaining of great pain all over the bowels, and sickness. Ordered a light mustard poultice to be applied over the stomach, and warm milk with lime water—three parts of the former to one of the latter—to be given every two hours, and the following mixture:—

℞ Olei ricini ℥xxjv
Spt. chloroformi ʒjss
Sol. morph. mur. ʒj
Pulv. gum acaciæ ʒijss
Syrupi ʒss
Aquæ ad ʒjv. M.

A small dessert spoonful every hour and a half till the bowels are quieted. 3 P.M.: Has had one motion; patient feels very comfortable; ordered arrowroot and milk, and medicine to be continued. 10 P.M.: Patient has passed a quiet evening. Diarrhœa ceased. 10 A.M.: Slept well and has taken bread and milk for breakfast. Bowels opened slightly, but naturally, about 5 P.M. Has had no more trouble.

II.—K. C., aged 12. For two nights has had four or five motions after going to bed. The stools consist mainly of mucus with a little undigested food. Patient feels pretty well during the day, but about midnight the diarrhœa begins and is accompanied by intense suffering. Ordered milk diet, but no medicine. During the night was up four times, each motion being accompanied by severe griping and tenesmus. Ordered:—

℞ Olei ricini ♏xvj
Sol. morph. mur. ʒss
Spt. chloroformi ʒj
Pulv. gum acaciæ ʒij
Syrupi ʒiij
Aquæ cinnam. ad ʒij. M.

A teaspoonful every four hours and after each motion in the night. Has had three motions. Scarcely any pain. Next night two motions, and on the fifth day from the attack was perfectly well.

III.—M. S., aged 74. A delicate, nervous lady. Has been suffering from severe diarrhœa for a week. Has tried several homœopathic medicines, which she says used to do her good. Feels very sick, and complains of great uneasiness over the abdomen. Went to the closet eleven times during the last fifteen hours. Is very prostrate, and eats nothing. Tells me she cannot take *strong* medicines, and that one drop of laudanum would affect her head. At 10 A.M. ordered milk and lime water, with a linseed poultice for the abdomen. Also the following:—

℞ Olei ricini ♏xij
Sol. morph. mur. ♏xxxij
Spt. chloroformi ♏xlviij
Pulv. gum acaciæ ʒij
Syrupi ʒiij
Aquæ cinnam. ad ʒij. M.

A teaspoonful every two hours. 6 P.M.: Has had three motions, but feels much better. 10 A.M.: Only two motions since last visit. Next day feels quite well. Has had no return of the diarrhœa.

IV.—S. A., aged one year. Suffers very severely from diarrhœa with each tooth. One day had nine painful watery motions. Child looks ill-nourished and feeble, although carefully fed. Ordered:—

℞ Olei ricini ♏vj
Sol. morph. mur. ♏jv
Pulv. gum acaciæ ʒj
Syrupi ʒij
Aquæ anethi ad ʒj. M.

A teaspoonful every three hours. In a week there was a decided improvement in the child's health. It took its food and slept better, and the motions were never more than two or three in the twenty-four hours. With its subsequent teeth the emulsion mixture was always used when the bowels became disturbed, with the most beneficial results. The child is now twenty-two months old. The canine teeth are all through, and it is in perfect health.

V.—H. F., aged 67. Was laid down with typhoid fever in November last. The diarrhœa set in with great severity, on the first two days the motions being eleven and fifteen respectively. The fever terminated on the twenty-eighth day. During the entire course of the disease the following was the only medicine used :—

℞ Olei ricini ♏xvj
Sol. morph. mur. ♏lxjv
Pulv. gum acaciæ ʒij ss
Syrupi ʒiij
Aquæ ad ʒij.

A teaspoonful every four hours. The diarrhœa was kept in check, and the patient scarcely complained of any intestinal discomfort. Once or twice the morphia was omitted from the mixture, but this was the only change made.

REMARKS.

1. When the diarrhœa is chronic, and the stools contain mucus, I usually increase the dose of castor oil to from four to six drops.

2. If the pain is very severe, six drops of morphia may be given with each dose, but I have never had occasion to give more.

3. If the mixture is carefully prepared it is pleasant and readily taken, and the taste of the oil is so completely covered that in only two or three cases of the large number in which I have given it, was the mixture suspected to taste like castor oil.

4. The mixture does not keep well, especially in warm weather, but the addition of four grains of quinine to a three-ounce bottle will keep it fresh for several weeks.

5. I have given it in every form of diarrhœa.

ON THE TREATMENT OF RHEUMATISM AND GOUT WITH TRIMETHYLAMINE.

BY W. H. SPENCER, A.M., M.B. CANTAB.

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(*Continued from* p. 99.)

CASE VI.—John W., aged 28. This man had suffered three previous attacks of acute rheumatism, and had been in hospital each time. This time he had been ill off and on for nine weeks. Admitted August 27th, 1873. Had pain and swelling in both feet; the right hand and wrist were painful and swollen. He was sweating, and his tongue was white and furred. A mitral bruit, judged to be of old standing, was detected. Ordered *three minims of trimethylamine every two hours.* 28th: Complained of much pain in the right side (pleuritic). Had no pain in the wrist, and the swelling was less. There was considerable excitation of the heart, and some sternal pain. The pains were bad at night. *Had chloral draught at night.* 29th: The pains had remitted, and no pain at all was felt whilst lying still. The sternal pain continued, but the heart was quiet, and after this date there were no cardiac symptoms during the progress of the case. 31st: Had only a little pain in the right shoulder; the pains are still considerable at night. Sept. 3rd: Was free from pain, felt much better, and wished to get up. *Ordered quinine.* At this time there was evidence of some effusion into the right pleura. 4th: Had some pain in the right knee and shoulder. (This man and a patient in an adjoining bed were much exposed to and affected by the draughts in the ward.) *Ordered two*

minims of trimethlyamine every two hours. 6th: All pain had gone. The man got up and went on well until, on the 10th, the pains returned with sweating. He felt, he said, nervous and bad in himself. *The dose was increased to five minims.* 13th: All pain had gone, the tongue was clean, and the appetite was good. Complained of frontal headache. *Ordered quinine.* The pain returned for one night, otherwise he went on well. 22nd: Pain returned in the wrist and knees. *Ordered eight minims of trimethylamine every four hours.* In two days the pains were gone again, and the man was discharged on the 26th, quite free from pain or other trouble, and feeling well.

[I attribute the nervous symptoms and the headache in this case to the trimethylamine. Patients sometimes, especially after taking the medicine for some time in frequent doses, voluntarily speak of such symptoms, but they have always been insignificant; I have never had to suspend the treatment on account of such symptoms. It is quite likely that with larger doses than I have used, the effects in this direction might be more striking.]

Case VII.—Alma F., aged 12. Had been ill for a fortnight. Admitted on December 10th, 1873. She then complained of pains in the arms and legs; the right ankle and the left wrist were swollen. The tongue was covered with a thick creamy fur. She was not sweating much, and there was no cardiac anomaly. A purge and Dover's powder were given. 11th: The pain was very severe, the fingers swollen, and movement impossible. The features and decubitus were expressive of great pain. *Ordered two minims of the chloride of trimethylamine every two hours.* 13th: Had no pain at all when lying still; could move the arms and legs with little discomfort; the swelling had almost gone. She perspired freely the day before. The appetite had returned, and she requested more food. 14th: All pain and swelling had disappeared. On the following day the temperature had become normal. *A quinine mixture was ordered.* 23rd: Discharged well, having gone on uninterruptedly without any recurrence of pain whatever.

Case VIII.—Kate P., aged 11. Was taken ill with shivering and pains in the back, knees, ankles and feet, on January 3rd, 1874. Admitted Jan. 5th, and ordered a purge. Jan. 6th: She complained of much pain in both legs; the right ankle was

swollen. The heart's action was strong and tumultuous, she had precordial pain, and a systolic bruit was heard at the heart's apex. *Ordered eight minims of the chloride of trimethylamine every three hours.* 7th: The pains were less severe. She looked and felt better. The heart was quieter. In all other respects was much the same. 9th: Had no pain at all, and all swelling had disappeared. She could raise herself in bed and move freely without pain. 10th: Was very much better. The cardiac symptoms had subsided, but the apex bruit persisted. (There was no history of any previous attack.) 11th: *Ordered quinine.* 19th: Had improved without check, and was well enough to leave.

Case IX.—Alfred W., aged 34. Had been under my care for suppurative erysipelas of left shoulder and arm (at the site of a recent injury). His wife also at the same time had been in the infirmary for suppurative facial erysipelas. He had quite recovered and was waiting for fine weather to go out, when he was attacked on February 27th with acute rheumatism, from which he had suffered previously more than once. He had had occasional rheumatic pains in the elbows during the course of the erysipelas. March 2nd: Had pain in both elbows and feet, very severe at night; the right ankle was swollen; the tongue was white; was sweating. *Ordered eight minims of chloride of trimethylamine every three hours.* 4th: Pain was much better; was able to get up, but still had some pain occasionally in the elbows. 5th: Had no pain at all. *Ordered citrate of iron and iodide of potassium.* 12th: No pain had recurred, and he was discharged well.

[The last three cases illustrate the effects of the chloride of trimethylamine. In other cases, in which the chloride was wholly or partially used, the results appeared not to be so satisfactory as those obtained with trimethylamine alone, as will appear further on. The subsidence of the cardiac symptoms in Case IX. may be worth notice.]

Case X.—Nicholas S., aged 66. A broken-down old man, with whining voice and full of miseries. Had been ill for six weeks, and for three years before had been unwell at intervals. The illness began with articular swelling and pain, chiefly in the hands, knees and ankles; the pain prevented sleep. Admitted

March 3rd, 1874. Had pains all over, especially severe in the joints above mentioned, without swelling. 5th: The pains were as bad as ever. *Ordered eight minims of trimethylamine every four hours.* 7th: The pains were unrelieved; *trimethylamine increased to twelve minims.* 10th: The pains were greatly relieved, and he had slept better for two nights than he had done for a long time. 12th: Pain had left him, but he complained of much headache. *Ordered to take the medicine three times a day.* 14th: Complained of considerable colic, and had some diarrhœa; still no pain in joints. *Ordered quinine and opium.* 19th: Complained of sickness and pain at the epigastrium, especially after food. 24th: All gastric symptoms had subsided, and he felt hungry and well enough to get up. 26th: Has had some return of pain in both ankles; otherwise appeared to be better. *Ordered six minims of chloride of trimethylamine with quinine three times a day.* 30th: Pain at the epigastrium (he said "burning") had returned, and he was very tremulous and out of spirits. *The quinine and opium was resumed.* From this date the gastric symptoms abated, but on April 5th he was attacked with sudden syncope, and before the house-surgeon could reach him he died. At the post-mortem examination the lungs were found to be healthy, the left ventricle hypertrophied, the kidneys small and granular, and there were deposits of urates in the great toe-joints. The liver was not healthy.

The stomach was much injected, and gave evidence of recent inflammatory action.

[Gastric disturbance and diarrhœa sometimes follow the exhibition of trimethylamine. In this case, I think the gastric symptoms and the condition of the stomach were undoubtedly due, at least in part, to the trimethylamine. The fact that trimethylamine can produce such effects is most important, but so far as my experience goes, such effects require the special conditions of an impaired constitution or previous disorder of the gastric organs for their production. Physiologically, trimethylamine is, in the stomach, stimulating, subsequently producing irritation and its results, vomiting, &c.; if injected subcutaneously, such effects are not produced. MM. Cadet-Gassicourt and Hirue have recorded cases of gastro-enteritis due to the local action of the remedy. In the above case, notwith-

standing its irritating effects, the remedy appears to have relieved the rheumatic (or gouty ?) pains.]

Case XI.—Eleanor R., aged 19, domestic servant. On March 26th, 1874, first had pains in the legs. On the 27th, had acute pain in the knees, ankles and feet. On the 28th, was worse and had to take to bed; perspired a good deal. Admitted on the 30th: was seen by me on the 31st: she then complained of pains in the shoulders, elbows, right hand, knees, ankles and feet. She was sweating considerably, and there was pericardial friction at the heart's base and down the sternum. *Ordered eight minims of trimethylamine every four hours.* The pains became easier on the second day, and disappeared from one joint after another, until on the fifth day they disappeared entirely and did not return. The cardiac symptoms came to nothing, and recovery was uninterrupted from the day on which the pains ceased.

Case XII.—William R., aged 52, a coachman. Had had repeated attacks of gout in both great toes. He had erysipelas four weeks before admission; a fortnight later pains came on in the knees and elbows (the right knee being swollen); subsequently the feet became affected. Admitted March 31st, 1874. Had pain in the right elbow and wrist (which was red and swollen), the left elbow, the left knee (with effusion) and both feet. There were old deformities of the finger-joints on both hands. *Ordered eight minims of chloride of trimethylamine every four hours.* April 3rd: Had no pain, when lying still; the left knee was better, and the redness and swelling of the wrist had gone, but both these joints were tender on pressure. *Trimethylamine had to be substituted for the chloride.* 4th: Had no pain even on movement, and wished to get up. 7th: No pain; slept well, and had a good appetite. He was kept in bed until the 15th, on account of a hernia which required attention. Some pain had recurred in the left knee at intervals during this time, but otherwise he had been quite free from pain, and felt well in himself. 15th: Got up and was none the worse. *Ordered quinine and pills of colchicum and carbonate of lithia.* The pain did not return, but he was stiff and weak in the affected knee until his discharge on April 29th. He was detained longer than would otherwise have been needful, on account of the hernia.

Case XIII.—Mary O., aged 11. Was attacked with rigors and pains all over, on March 27th, 1874. The legs, arms, and wrists became affected. Two days after she had pain in the chest. Admitted March 31st. The pains in the legs and arms were severe; she could not move. Had been sweating profusely, and the tongue was white and furred. The patient had a strongly marked tubercular aspect, and was pale and emaciated; at the apex of the left lung there was tubular breathing and dulness. April 1st: The pains had been severe in the night; had no sleep. A loud to-and-fro sound was heard at the base of the heart and down to and outside the left nipple. Still had pain in the chest. *Ordered four minims of chloride of trimethylamine every four hours.* 2nd: The pain was less severe, but she did not sleep well; the pain in the chest was better. The cardiac friction had more of a blowing character. 3rd: Slept well. Could move without pain. Had still some pain outside the left nipple and down the left side. Felt much better. The heart's action was quiet, and friction was heard only outside the left nipple. Tongue cleaner, and took her food well (the appetite had not been greatly interfered with at all). 4th: Slept well. Had no pain at all. Cardiac friction fainter. The area of cardiac dulness had increased. *Trimethylamine had to be substituted for the chloride.* 6th: Still improving. Heart as before. *Ordered quinine and cod-liver oil.* 9th: Was much better. Cardiac friction had disappeared, and a soft systolic pulmonic murmur alone was audible. 18th: Had continued steadily to improve in every way. A slight pulmonic murmur was the only anomaly about the heart. Was greatly improved in appearance and general health.

Case XIV.—Sarah D., aged 20. Had had one previous attack. The present illness dated back four days. Admitted April 1st. Had pains in back, knees and ankles, and the usual concomitants of what is usually called "sub-acute rheumatism." *Ordered mistura gentianæ co.*, after purgation. The pains and other symptoms got worse, the patient felt worse and vomited. 6th: Ordered eight minims of chloride of trimethylamine every four hours. 8th: Pains were nearly gone, and the patient felt much better. She had asked for more food the day before. 10th: The pains recurred more or less for two days, and the

appetite failed. 14th: Was free from pain, and much better again. 16th: *Quinine* was substituted for the trimethylamine, and the patient went on uninterruptedly to complete recovery.

Case XV.—William C., aged 50. Was admitted to the surgical wards for a sprained foot on March 31st, 1874. Soon after he felt pain in the right ankle, which extended to other joints of the same limb. Was treated with alkalies and colchicum, and came under my care on April 6th: he then had severe pains in both arms (the right hand and wrist being swollen) and the left shoulder, and some pain in the right foot. Was sweating considerably. Had had sternal pain since the beginning of the attack; the cardiac sounds were weak and distant; there was a systolic bruit at the apex, and friction was heard at the base. *Ordered eight minims of chloride of trimethylamine every four hours.* The pains had extended to the left leg. 10th: Pains had been severe and very shifting. Had had no sleep, and a good deal of pain in chest. *Ordered twelve minims of the chloride.* 12th: Had pain only in the legs on movement. The hands were still swollen, but could be moved with little discomfort. No cardiac friction could be heard at the base. Was sweating much. Felt a good deal better in himself. 13th: Pains bad again. 14th: Pain almost *nil*. Wanted more to eat. 16th: The legs were much better; he could stand upon them without pain. Some pain had come on in the morning suddenly in the right hand and arm; otherwise was free. Cardiac sounds were very weak, there was no basic friction, and the heart was quiet, but the apex bruit was still distinct. 18th: Had no pain at all, except that some slight pain in the shoulder was felt on moving the right arm; there was no swelling. The appetite was good, and in every respect the patient was much better. The mixture had been taken three times a day since the 23rd. 26th: Was quite free from pain. *Ordered quinine.* 29th: Was obliged to return to bed from recurrence of pains in lumbar region; the neck was stiff. *Ordered five minims of trimethylamine every two hours.* 30th: The pain had gone, and he was up again. May 1st: Pains recurred in the shoulders, arms, and hands, in the hamstring tendons and right knee; the wrists were somewhat swollen. *Ordered eight minims of trimethylamine every two hours.* 5th: The pains had gradually disappeared,

and he could now stand without difficulty. 9th: Stiffness in shoulders only remained. Was put upon *phosphate of soda and bark*. He was well enough to leave. He continued to attend as an out-patient, and improved steadily in health without any return of his pains.

[The case, briefly analysed, comes to this:—The pains were subdued on the sixth day after commencing the treatment. On the twelfth day the pains disappeared, the appetite was good, and the attack, including the cardiac complication, appeared to have come to an end. The man mended steadily, but eleven days after the cessation of pain lumbago appeared, which was succeeded on the second following day by a general return of the pains. This second attack yielded in five days. This man and the subject of Case VI. were of what is called phlegmatic temperament; they were rather fat, flabby, and pale. I have certainly found that trimethylamine does not produce so marked and speedy effects in such persons as in those of sanguine or nervous temperament. I have lately had four cases of acute rheumatism with pericarditis under my care; the affection was about equally severe and of the same type in each, and they were all treated in exactly the same way. Two of these patients were decidedly sanguine, two were equally phlegmatic (chlorotic). The two former lost their pains quickly and mended rapidly; the two latter showed no signs of improvement for several days, and then, so to speak, crawled out of their troubles.]

Case XVI.—Mary Ann D., aged 51. For four months had been so unwell as to be confined to bed most of the time; pain came first in the hands and feet. Had been subject to rheumatism for some years, and last year had an attack of acute rheumatism. Admitted May 30, 1874. Was cachectic, very debilitated, and nervous. Had some pains in the right knee and foot (both joints being somewhat swollen) and in both arms and hands. The tongue was white; the appetite was bad. She was perspiring much, and could not sleep for the pain. *Ordered five minims of trimethylamine every two hours.* 31st: The pains were very severe, especially in the back and right shoulder. Complained also of pain at the epigastrium and of headache. The tongue was dry, and the pulse was 124. Cardiac friction was observed to the right of the heart's apex, and there was

some pericardial pain. June 1st: The knee and foot were much better and not swollen; otherwise was much the same. The epigastric pain had been relieved by purgation with castor oil. *Ordered a morphia draught at night.* 2nd: The pains were better. The tongue was brown and dry. Still had headache. 3rd: Could move the hands and feet without difficulty, and the pain generally was much less. The tongue was moister; no headache. 4th: Slept well without a draught. Had no pain, and was much better in every respect. Some cardiac friction was still heard at the apex. 6th: No cardiac friction; heart quiet and regular; sounds normal. Had no pain at all, and complained only of stiffness in the affected joints. 7th: Some pain recurred in the shoulders and hands (due to the draughty state of the ward). 10th: Was better. *Quinine was substituted for the trimethylamine.* She went on tolerably well, with occasional return of pains (such as she said she had been subject to for years) until the 20th. Then the pain returned more decidedly in the right knee and arms; she could not move the right leg. *Ordered ten minims of chloride of trimethylamine every three hours.* 22nd: Had pain only when the right knee was moved. The appetite was good, and she felt better in every way. 26th: Was quite free from pain. Had been up to have the bed made, and could use the leg without pain. Slight sores had appeared on the nose and coccyx some days before this date, which rapidly passed into a carbuncular condition. *Quinine was substituted for trimethylamine.* From this time the patient went on steadily to recovery; citrate of iron with iodide of potassium was prescribed on July 1st; the sores healed, and she was discharged tolerably well and quite free from rheumatism on July 11th. Six months later she was well, and had no return of the rheumatism.

[This case is interesting for several reasons. First, it was a protracted case; due, I take it, to the cachexia and the fact that the patient had been ill, and in bed chiefly, for four months before admission to the infirmary. Yet the trimethylamine appears to have produced good effects. Secondly, there was some cardiac complication, which, in such a patient and with fever of an asthenic type, might have pursued a less satisfactory course. Thirdly, the recovery was permanent. And lastly—

and for this reason more especially I note the case—trimethylamine probably caused sloughing in what would otherwise have been very ordinary sores. The course taken by these sores was very striking, and when the trimethylamine was discontinued the change for the better was very marked. In a second case similar phenomena were noted. The patient was a bucolic, fat and pasty-faced lad, aged 15, who, his mother said, had been ill for eighteen months with the rheumatism for which he came to the infirmary, and who had passed eight months of that time in bed. The lad obviously made himself out to be worse than he really was, but I believe he really had some rheumatism, affecting certainly the groins. After he had been in the infirmary three weeks, a bubo commenced in the left groin. He was put upon six minims of the chloride of trimethylamine every two hours, and in a few days the same quantity of trimethylamine was substituted every four hours. The bubo went on to suppuration, and suppurated deeply and in sinuses to an unusual degree. The surgeon who was assisting in the case at length suggested that the trimethylamine was influencing the progress of the bubo, and accordingly its use was discontinued in favour of quinine and the syrup of the iodide of iron. From that time things mended and the bubo rapidly healed.]

Case XVII.—Gustav B., aged 45. Was admitted on May 30, 1874, with severe pain in the hands, knees and feet (the hands and feet being much swollen and red). He had tophi in both ears, and deposits in the joints and ends of the fingers. *Ordered five minims of trimethylamine every two hours.* June 1st: The pains, swelling and redness were much reduced; the pain and tenderness were almost confined to the right ankle. 3rd: Had no pain in the hands; some pain still in the ankle. 5th: Had no pain, swelling or redness anywhere. Felt much better. *Trimethylamine every four hours.* 8th: Was still well, and was put upon carbonate of lithium with phosphate of soda and bark. He took this for a week, and then quinine and iron. He went on well and was up daily until the 27th, when pain and swelling returned in the left hand. *Trimethylamine resumed* as before. 29th: The pain had disappeared, and the swelling also disappeared in a day or two. *The quinine and iron was resumed* on July 4th. He went on well, and on the 14th the concretions

of urates began to ulcerate their way out of the ends of the fingers. This went on extensively, without pain, for some days. On the 25th, beyond occasional twinges he had no pain and was much improved; he was discharged on the 30th.

Case XVIII.—William H., aged 47. This man had had periodical attacks of gout. He was admitted to the infirmary for sprained ankle on March 12th, 1874, and on the day after came under my care for a sharp attack of gout, implicating both knees and feet. He was treated for this with colchicum and carbonate of lithium, got over it slowly, and was just on the point of leaving, on April 14th, when he was attacked a second time. The knees and feet were again affected, the pain in the left knee was very acute, and the joint very much swollen. *Ordered five minims of trimethylamine every four hours.* 16th: The pain remitted considerably in the morning: the swelling was less. He said that in the night he felt very hot and had frontal headache, and he attributed this to the medicine. 20th: The pain and swelling had gradually and steadily decreased; he had only occasional pain on movement. 24th: He was quite free from pain and swelling, and got up. On May 6th, bronchitis came on and he took to bed again, still free from pain. 9th: He had a third attack of pain and swelling in the left knee and right elbow. He was treated with phosphate of soda and colchicum, and a lotion of phosphate of soda was used externally. 11th: As there was no improvement, the doses were increased. 16th: He was better: the colchicum was omitted. 21st: The pains were bad again, and the colchicum was resumed with carbonate of lithium. He then improved and was discharged, pretty well, on June 6th. He continued to attend as an out-patient for some weeks, and went on well. Six months after he was walking about briskly and quite well.

[It was in watching such cases as these two that the thought arose whether in using trimethylamine (a compound and organic alkaline product) we are really carrying out more perfectly the time-honoured alkaline plan of treatment. If, as I think likely, we have in rheumatism and gout arrest of the retrograde metamorphoses of nitrogenous constituents of the tissues—with accumulation of acid products belonging to the series represented by xanthin and lactic acid at one end and urea and

carbonic acid at the other—it is easy to conceive that in exhibiting such a substance as we know trimethylamine chemically to be, we furnish complete conditions for the transformation of these acid products to the state of amides and their further elimination from the body in proper form. I do not push this theory; it is at present in my own mind in a crude and imperfect shape. I shall hope, in the future, should further researches warrant, to develop more fully these views. At present I can only claim a clue, through trimethylamine, to a possible solution of the problem—What is the essence of rheumatism and gout?]

Case XIX.—James P., aged 23. This man came under my care for acute rheumatism on the fourth day of the attack. He had had a similar attack eighteen months before. On admission, June 22nd, 1874, he had severe pains in the right shoulder and the neck, in the right hand (which was red and swollen), and in both knees, ankles and feet (the ankles being red and swollen). The tongue was covered with a creamy white fur; he was sweating much, had no appetite, and could not sleep. Loud pericardial friction was observed at the base of the heart. Pulse 124, weak and irregular; temperature 101·6°. *Ordered eight minims of chloride of trimethylamine every two hours*, after purgation. 23rd: Had considerable pericardial pain; otherwise the same. 24th: Slept well. The pains present on admission were quite absent when he was lying still; could move the right leg without pain. The left arm and shoulder were affected. He had no precordial pain; the friction-sound had not extended and was less audible. He was sweating profusely. 25th: He was quite free from pain, except in the left groin. 26th: He had no pain at all, although some pain recurred during the night in the right shoulder. He felt much better. 27th: Some pain, with tumefaction, returned in the left hand; otherwise was better. The appetite was better. 28th: Had no pain at all. 29th: Still no pain. The pericardial friction hardly discoverable; some effusion. Felt hungry. 30th: Pain had returned in the arms. The tongue was clean. Was still sweating. *The mixture to be taken every four hours.* July 1st: Had pain in the arms only when they were moved. Felt much better in himself, and requested more food. 3rd: Had no pain. *Ordered quinine.* 7th: Had gone on well, and was up. No

halt occurred in the further progress to recovery, and the man was discharged, well, on the 20th.

The following observations were made in this case :—

Date.	Temperature.		Pulse.		Respirations.		Urine.
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	
June 22	—	101·6°	—	96	—	26	—
,, 23	102·8°	100·2	100	84		28	2000 c.c.
,, 24	100·8	101·4	96	90	32	28	1000 ,,
,, 25	100·6	101·2	80	84	24	18	1000 ,,
,, 26	99·8	100·6	84	76	28	26	1000 ,,
,, 27	99	100	80	84	32	24	1000 ,,
,, 28	99·8	99·6	84	80	24	22	588 ,,
,, 29	99·4	100	84	76	28	28	1500 ,,
,, 30	100·2	99·2	84	86	20	26	1060 ,,
July 1	99·2	98·6	88	80	24	20	1000 ,,
,, 2	99	98·4	84	76	16	24	500 ,,
,, 3	98·4	98·8	64	74	—	24	545 ,,
,, 4	98	98·4	64	56	—	20	1000 ,,
,, 5	98·2	98·2	56	52	22	20	—

[When he was admitted, this man was in a most deplorable state; the rheumatic symptoms were of the acutest kind. On the fourth day of treatment the pains ceased everywhere. Then, for six days, there were inconsiderable and partial returns of pain in the arms only, with periods of complete remission. By the eleventh day he was convalescent, and went on to complete recovery from that time. The cardiac complication, as in many other cases, appeared to abort.]

Case XX.—Charles B., aged 22. Had always been tolerably healthy, but subject to cough; his father died of phthisis. Was taken ill three days before admission with pains in the back, and then in the knees and ankles. Had never had rheumatism before. Admitted on August 10th, 1874. Had severe pain in the knees and ankles, which were very tender and swollen. The tongue was thickly furred, he was sweating profusely, and had no appetite. His pulse was 120; temperature 102·2°. Some roughness with the cardiac sounds was heard at the second interspace and third rib, close to the left edge of the sternum. Breath-sounds everywhere normal. *Ordered eight minims of chloride of trimethylamine every three hours*, after purgation. 11th: Had additional pains and swelling in the

right wrist and hand. 12th: Pains much less in the legs and less in the right arm. The entire left arm was affected. Cardiac roughness remained. 13th: The pains were very fugitive, and severe enough at night to prevent sleep. 14th: He expressed himself as "a lot better." From 7 A.M. had been free from pain, the pains having remitted considerably the previous afternoon. 15th: Pain had returned in the arms during the night (though he slept well), and had continued. Was still sweating profusely and covered with sudamina. 16th: Some pain recurred occasionally in the arms and legs. Had epistaxis twice. 18th: Pain was more acute midday than it had been at all, both in arms and legs. Prolongation of the first cardiac sound had replaced the roughness at the base. The pains remitted at 6 P.M. 19th: Pains recurred at 6 A.M. as bad as ever, to remit again at 6 P.M.; thence they remained absent until the next evening. He went on in much the same way, feeling much better daily, and the pains recurring in similar fashion but with decreasing severity, until the 22nd, when *trimethylamine was substituted for the chloride.* 24th: The pains remitted wholly in the morning. The cardiac sounds were normal. 26th: The pain had recurred very slightly at intervals. Epistaxis recurred. He had slept well, and the tongue was cleaner. The pains gradually ceased to recur, and on the 30th they disappeared for good. In the evening of the 29th he had a sudden attack of dyspnœa, which lasted about five minutes. September 3rd: Had no pain, and could move freely without pain. *Ordered quinine.* From this point the man, though much pulled down, went on without check. He was discharged on the 23rd.

Trimethylamine had no influence whatever on the course of the fever, as indicated by the thermometer, in this case. It is claimed for the remedy that it reduces both temperature and pulse in a marked manner and rapidly. In several other of my cases temperatures were taken; but I can only say, as yet, that when the decrease of pain and other symptoms has been marked and rapid, the decrease in temperature (even from 104°) has been equally marked and rapid—and this is to say little.

The temperature and pulse observations were as follows:—

Date.	Temperature.		Pulse (average).	
	A.M.	P.M.		
Aug. 10 ...	—	102·2	120	
,, 11 ...	102·4	102·6	104	Trimethyl. chlor. mviij. (3 hours).
,, 12 ...	102·6	102·4	108	
,, 13 ...	102·2	102·2	108	
,, 14 ...	100·2	101·6	100	
,, 15 ...	101·2	103	100	
,, 16 ...	101	103	96	Ditto (4 hours).
,, 17 ..	102·6	102·6	96	
,, 18 ...	102	103·6	100	Ditto (3 hours).
,, 19 ...	102·2	103	100	Ditto (2 hours).
,, 20 ...	102·8	103·2	96	Epistaxis (twice).
,, 21 ...	102·6	103	92	
,, 22 ...	102·2	103	92	Trimethyl. mviij. (3 hours).
,, 23 ...	102·4	103	100	
,, 24 ...	102	103·6	--	
,, 25 .	102·2	103	108	
,, 26 ...	102·2	103	104	Epistaxis.
,, 27 ...	102	103·2	100	
,, 28 ...	102·6	103	112	Trimethyl. (2 hours).
,, 29 ...	102	102·6	104	Pain ceased.
,, 30 ...	102	103	104	Trimethyl. (4 hours). Pulse full and bounding.
,, 31 ...	101·6	103·6	116	Trimethyl. (ter in die).
Sept. 1 ...	102·4	101·6	108	
,, 2 ...	101·2	100·4	—	
,, 3 ...	100	100	—	Quinine.
,, 4 ...	98·8	99·4	--	
,, 5 ...	98·6	98·2	--	
,, 6 ...	98	—	—	

In this case, determinations of urea were made, and at the same time the urea was determined in a case of acute rheumatism treated wholly with aqua camphoræ. The details are appended in tabular form.

Continental observers have stated that under the influence of trimethylamine the amount of urine excreted is increased, whilst the amount of urea excreted is diminished. M. Bouchard found that one of the physiological effects of trimethylamine was diminution in the excretion of urea. It has also been observed that a sudden and inexplicable increase in the amount of urea excreted is liable to occur during the use of trimethylamine. All these observations are illustrated in the following table:—

Date	Total urine	Total urea.	Urea per 10 c.c.	Specific gravity.	Diet.
	c.c.	Grms.	Grm.		
Aug. 11*	795†	21·46	·27	1027	Milk 2½ pints; bread 8
,, 12	677	31·15	·46	1028	oz.; rice, &c., 8 oz.;
,, 13	765	29·09	·38	1029	beef-tea, 1 pint.
,, 14	795	37·26	·47	1035	
,, 15	824	36·27	·44	1030	
,, 16	1,235	43·22	·35	1031	
,, 17	1,206	39·79	·33	1022	
,, 18	2,000	25·00	·12	1007	
,, 19	2.382	27·39	·11	1009	
,, 20	1,809	32·57	·18	1012	
,, 21	2,154	34·47	·16	1013	Eggs (two) added.
,, 22‡	2,088	28·19	·13	1008	
,, 23	2,588	53·07	·20	1012	
,, 24	1,824	29·19	·16	1013	
,, 25	1,684	23·58	·14	1012	
,, 26	2,265	31·71	·14	1009	
,, 29§	2,000	24·00	·12	1007	Fowl added.
,, 31	1,500	39·01	·26	1014	
Sept. 1	2,824	53·66	·19	1010	
,, 2	2,000	44·00	·22	1014	

* Trimethyl. chlor. mviij. 3tis horis. Commenced at 3 P.M. on the 11th.
† Represents the quantity passed from 3 P.M. on the 10th to 3 P.M. on the 11th, and so for each succeeding date.
‡ Trimethyl. mviij. 3tis horis. Commenced at 3 P.M. on the 22nd.
§ Pain ceased for good.

CASE TREATED WITH AQUA CAMPHORÆ.

Date.	Total urine.	Total urea.	Urea per 10 c.c.	Specific gravity.	Diet.
	c.c.	Grms.	Grm.		
Aug. 15	1,235	29·64	·24	1016	Milk, 2½ pints; bread,
,, 16	589	21·79	·37	1024	8 oz.; rice, &c., 8 oz.;
,, 17	1,705	59·67	·35	1023	beef-tea, 1 pint.
,, 18	500	14·00	·28	1017	
,, 19	1,000	35·00	·35	1020	
,, 20	625	24·71	·39	1017	
,, 21	1,203	49·94	·41	1021	Meat added.
,, 22	500	22·75	·45	1021	
,, 23	1,000	41·00	·41	1020	
,, 24*	868	28·66	·33	1016	
,, 25	1,000	27·50	·27	1014	
,, 26	853	28·18	·33	1020	

* Pain ceased for good.

CASE XXI.—George B., aged 34, a month before his admission was attacked with pains in the knees, calves, and ankles. Subsequently the upper arms, elbows, and wrists

became affected. He had been in bed most of the time. Admitted 17th August, 1874. The pains affected the parts above named, and were bad at night. The appetite was pretty good, and there was no unusual sweating. The legs and arms were thickly covered with crops of purpuric spots, which had appeared ten days before. These spots continued to come out in crops and to disappear (passing through changes of colour), accessions of pain marking the coming out, until the 27th. He was treated meanwhile in various ways, as if the affection was "a form of purpura accompanied with rheumatic pains" (the *peliosis rheumatica* of Schönbein), without any effect whatever. On the 27th, the pains being very severe, especially in the large joints—and as he was sweating and had no appetite—he was ordered *eight minims of trimethylamine every three hours.* 30th: The pains were still severe, but somewhat less. Sept. 2nd: The pains began to remit, and in the evening ceased entirely. 4th: Was much better, and could move the limbs freely; the pains recurred very slightly at intervals. The spots continued to come and go up to this date. He had perspired freely since the 27th, and sudamina had appeared. He was so much better in every way on the 7th that he thought it unnecessary to remain in the house any longer, and left on that day.

[I have not unfrequently seen acute rheumatism accompanied with erythema nodosum, and have obtained equally satisfactory results with trimethylamine in such cases as in those accompanied with purpura.]

Case XXII.—Frederick R., aged 33. Three months before his admission he had acute rheumatism. He said he had never got over it; had kept his bed almost entirely, and had been unable to walk. Admitted on Oct. 15th, 1874. He could not walk at all. The legs were much wasted, the knees and ankles swollen, and he suffered a good deal of pain in these joints. The hands also were the seat of pain, and some of the joints were swollen. He was treated with *quinine and iodide of iron, and cod-liver oil.* He gradually improved so far as to be able to get up, but walked with difficulty, and the pain had continued more or less. On Nov. 5th he still had pains in the knees, and now also in the shoulders; the pains were worse at night. One finger-joint was swollen, red and painful. The ankles and

feet were still swollen. *Ordered eight minims of trimethylamine three times a day.* 7th: He had no pain anywhere, and all swelling had gone, so far as to allow him to put on his boots (for the first time since June). He could walk without pain, but stiffly. Expressed himself voluntarily as having felt very different since he took the medicine. 10th: Was still improving, and could bend his finger, which had been impossible before. 14th: Had continued well, and the *quinine, iron and cod-liver oil were resumed.* On the 21st he was discharged, presenting a very different appearance to that he had on admission.

I had intended to complete this paper by an analytical summary of all my cases, but for the present I must forego the intention. And this I am content to do, because I could now add many other interesting details of recent cases, and because —having now obtained a supply of crude, *i.e.* unrectified, "propylamine," prepared according to my own instructions— many other points await investigation. These other cases and other points I shall hope to make the subjects of a communication to the profession at some future time.

ON A MODIFICATION OF THE METHOD OF USING MALGAIGNE'S SCREW-HOOKS IN TRANSVERSE FRACTURE OF THE PATELLA.

BY JAMES SPENCE, F.R.S. Ed.,

Professor of Surgery in Edinburgh University.

The following paper refers no doubt to a surgical subject, but inasmuch as it deals not with surgical operations, but merely with a simple method of treatment, it may not unfitly find a place in a journal of therapeutics.

Although the screw-hooks designed by M. Malgaigne for transverse fracture of the patella are perfect as a mechanical contrivance for maintaining the fragments in accurate apposition, they have never yet been very generally used, owing to the pain and irritation caused by their sharp points when inserted through the skin into the broken fragments of the bone. Of late years I have adopted a method of using these hooks, which I find to answer the purpose admirably, without inserting the hooks through the integument. The two fragments of the patella being held by an assistant in as close apposition as the effusion in the knee-joint will permit, I apply a broad piece of strong moleskin adhesive plaster of the shape shown in Figs. 1 and 2 A to the thigh above the upper fragment of the patella, and another piece of plaster of the shape shown in Figs. 1 and 2 B from the upper part of the leg to the lower fragment of the bone. On the space marked C in the figures two or three layers of plaster are applied to protect the skin from the points of the hooks, which are inserted there above and below the fracture as shown in Figs. 3 and 4. The screw is

then gradually tightened, and the fragments are approximated and kept in apposition. The screw requires to be tightened

Fig. 1.

Fig. 2.

from time to time, and thus the fracture is kept accurately adjusted and in close apposition without any circular constriction

Fig. 3.

Fig. 4.

of the limb. Care must be taken to have the integuments on the stretch when the plasters are applied. The plasters should

not be much heated, otherwise they would be liable to slip, and they should be firmly adherent to the skin for some time before the hooks are inserted, or traction made on them by using the screw. For greater security against the plasters slipping, the main portions may be made sufficiently long to encircle the limb, and supported for twenty-four hours with a few turns of a roller. I prefer, however, the method described, as the plasters, if carefully applied, generally hold firmly, and should they yield they can be easily reapplied. I may mention that I have also tried this method in treating rupture of the ligamentum patellæ, but it does not answer so well in that injury as plasters with straps, one passing on either side of the patella, from the upper plaster to buckles fixed on the lower plaster. In both these injuries the limb should be placed on an inclined plane, or, better, slung at a corresponding inclination.

ON THE TREATMENT OF FRACTURE OF THE PATELLA.

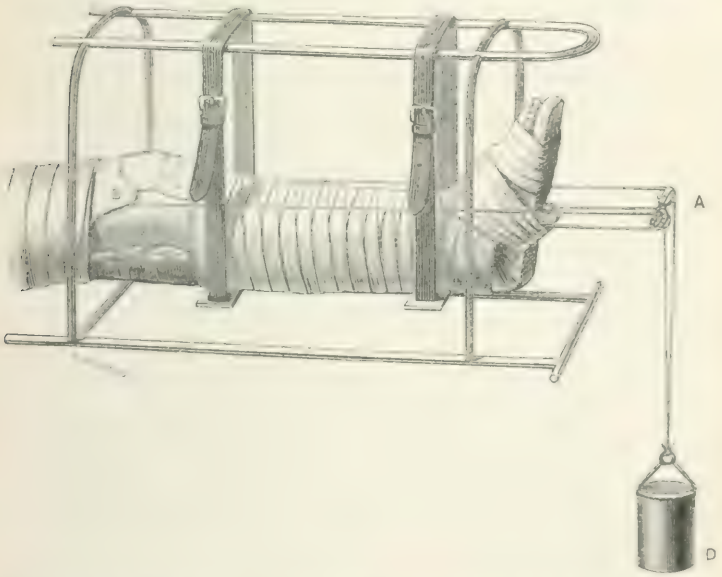
BY GEO. W. CALLENDER, F.R.S.,

Surgeon to St. Bartholomew's Hospital.

THE accompanying woodcut illustrates the plan of treating transverse fracture of the patella which has been employed for some years in my wards. Since referring to this method in the last volume of our Hospital Reports, several cases have been under treatment with good results, not only as to the close approximation of the fragments, but by the establishment of such firm union as simulates, if indeed it be not repair by true bone formation. I think the arrangement we employ has an advantage over the plan, which is advocated in America by Dr. Levis, of drawing together the two portions of the bone by means of long strips of plaster, because it enables continuous traction to be made in a horizontal line with the patella, and consequently there is less risk of tilting forward the broken edge of either fragment when traction is established.

The following is the manner of applying the apparatus:—"A day or two after admission the limb is placed on one of Neville's splints, to the foot-piece of which is clamped an iron, with two arms projecting beyond the foot-piece, at the end of each of which a pulley is fixed (A), a line from which will fall clear of the foot of the bedstead. A piece of ordinary adhesive plaster is applied to the front of the thigh, its distal end being curved to fit the upper margin of the patella, each horn of the crescent being arranged so as to form a loop (B). The edge of the plaster is protected by a strip of lint to prevent it from irritating the skin when under traction. A similar provision is made for the leg and for the lower fragment of the patella (C), and both pieces of plaster are further secured by bandages

passing over them and round the Neville splint. If a piece of cord is attached to each of the loops at the horns of the lower plaster (C), and is then passed through the upper loops (B), and is thence carried to the pulley at the end of the outrigger, below which the two cords may be united and made to support a weight (D), it is evident that the entire weight-traction will draw the horns of the two crescents together and approximate the fragments of the knee-cap. The cutting out and adapting of the pieces of plaster require care and some



practice, and from time to time these may need to be readjusted; but the whole arrangement is simple, and, I think, is worth further trial."

If there is any difficulty in obtaining the Neville splint and the iron clamp, a splint of wood with holes drilled (at a level to be determined on in each case) through the foot-piece to carry the cords will suffice as a substitute, or a pulley may easily be fixed to either side of such a foot-piece. It is necessary that the plaster should hold firmly. We find that which is in use at the Seamen's Hospital at Greenwich one of the best in this respect.

THE TREATMENT OF FRACTURES OF THE PATELLA AND OLECRANON BY THE EXPECTANT METHOD.

BY ARTHUR FERGUSSON M'GILL, F.R.C.S.,

Surgeon to the Leeds Public Dispensary.

It may be taken as an axiom in medical and surgical practice that the treatment of those diseases and injuries for which many remedies have been advised is as a rule unsatisfactory. For example, many drugs have been used in the treatment of tetanus and hydrophobia, and it would be impossible to name two diseases in which treatment is of less avail. In a minor degree this remark applies to the treatment of fracture of the patella. There is no fracture to which a greater variety of splints and apparatus has been applied, and yet the results are by no means satisfactory; bony union is of rare occurrence, and consequently the affected limb rarely becomes as strong as it was before the accident. It has fallen to my lot to see, and have more or less under my care as a house-surgeon, a considerable number of these fractures. The treatment adopted has been chiefly of four kinds.

(1). Malgaigne's hooks, of which I need only say that though they are theoretically of great value, practically their use is found to be attended with considerable danger. I well remember a case which occurred in King's College Hospital during the winter of 1864. The patient was a drunken woman who sold play-bills in Drury Lane. She was admitted with fracture of the patella; the hooks were applied with great skill and care, but erysipelas and diffuse cellular inflammation supervened, and she died from the effects of the treatment.

(2). Professor Wood's method, by a figure-of-eight bandage passing through hooks on the under surface of the splint. Though by this means the fragments can be closely approximated, yet, owing to the direction in which the bandage is applied, the fragments are tilted forwards, and consequently placed in a position which does not favour union.

(3). Samborn's method. A pad being placed above and below the broken fragments, a long strip of plaster is applied on the anterior surface of the thigh and leg, extending from the hip to the ankle; a loop is left over the knee-joint, and into this a stick is inserted; by twisting the loop by means of the stick, the pads are brought together and drag the fragments of the patella with them. By this means they can be closely approximated, and this without any objectionable tilting. The results obtained by this plan of treatment are excellent.

(4). The plan of treatment adopted by Mr. Pridgin Teale, which does away with the necessity for any special apparatus, which combines the two great desiderata, simplicity and efficiency, and which I think may with propriety be designated the "Expectant Treatment." Mr. Teale has most kindly allowed me to take the two following cases from his notebook at the Leeds Infirmary. They are the first two cases in which this method was adopted, and well exemplify the treatment.

A railway porter, aged 26, was admitted into the Leeds Infirmary Dec. 22nd, 1865, under the care of Mr. Teale. While moving a large iron wheel, it fell over and knocked him down, striking his knee as it fell. He was unable to walk, and was immediately brought to the Infirmary. On examination it was found that the patella was fractured transversely about its centre, and that the fragments were separated for half an inch; the joint was much swollen. The leg was placed on a pillow and slightly bent between sandbags, and evaporating lotion was applied. By Jan. 12th the distance between the fragments had diminished to one quarter of an inch; by Feb. 4th they were almost touching; on Feb. 11th the patient was allowed to get up with a starch bandage on; and on Feb. 20th he was made an out-patient, the fracture being united without any perceptible interval, apparently by a band of strong fibrous tissue.

The next case is even more striking. A dyer, aged 43, on Jan. 23rd, 1867, fell on his knee, striking it violently against a stone; he was brought the same day to the Leeds Infirmary, and was admitted under the care of Mr. Teale. A fracture of the patella was discovered, but owing to the large amount of effusion in the joint, the distance between the fragments could not be ascertained with certainty. The leg was placed on a straight splint, with the heel slightly raised, and evaporating lotion was applied. In five days (Jan. 28th the effusion had much subsided, and from this date the interval between the fragments was measured with great accuracy. The measurements were as follows:—Jan. 28th, $1\frac{1}{4}$ in.; Feb. 4th, $1\frac{1}{16}$ in.; Feb. 11th, $\frac{3}{4}$ in.; Feb. 18th, $\frac{1}{2}$ in.; Feb. 25th, $\frac{3}{8}$ in.; March 4th, $\frac{1}{4}$ in.; On March 11th the splint was removed, and a knee-cap of chamois leather having been fitted accurately to the joint, he was made an out-patient; the union being apparently strong and fibrous.

Since the above date Mr. Teale has treated all cases of fracture of the patella in a similar manner, and I can testify that in those cases in which I have seen it adopted the result has been equal to that which can be obtained by any other plan, while the comfort of the patient has been much greater. It is a matter of but little consequence whether the limb be placed on a straight back splint, or on a pillow between sandbags. In either case the patient should be confined to bed for six or eight weeks, and when allowed to get up should be fitted with a soft leather splint, which will limit but not arrest the movements of the joint.

Three reasons can be assigned for the gradual approximation of the broken fragments:—(1) At the time of the injury the quadriceps extensor is thrown into a state of tonic contraction: after a few days this contraction relaxes, and the muscle gradually regains its normal length, thus removing all traction from the broken bone. (2) The effusion which always occurs at the time of the accident is slowly absorbed, and by its removal allows the fragments to fall together; and (3) the fibrous band which is formed between the opposing surfaces has, like all other cicatricial tissue, a tendency to contract, and thus to complete the approximation.

Fracture of the olecranon is both a less severe and less frequent accident than fracture of the patella. The union is occasionally bony, but usually by fibrous tissue. In the latter case the movements and usefulness of the arm are but slightly, if at all, impaired. Before I was aware of Mr. Teale's treatment for fracture of the patella as described above, I was in the habit of treating these cases by placing the arm on a rectangular splint in a semiflexed position. The results obtained in this way are as good as those obtained by any other method. Bony union will occasionally occur, as the following case will show. In 1870 I had under my care a boy, aged 14, who had fractured his olecranon process by a fall on the elbow. The upper half of the process was freely moveable with crepitation, but was not removed far from its normal position. The arm was kept on a rectangular splint for a month. The fractured piece was then firmly united to the shaft, and it was only by a careful examination that the seat of the fracture would be detected. In other cases the result has not been so good as this, but in all there has been a gradual approximation of the broken fragment to the shaft, similar to that described above as occurring in fracture of the patella. The comfort of the patient is much greater than if the arm were kept in an extended position; and if anchylosis should occur, as it is reported sometimes to do, the limb would be in a useful and not in a useless position.

DIFFERENTIAL DIAGNOSIS BETWEEN CALCULOUS PYELITIS AND TUBERCULAR OR SCROFULOUS PYELITIS.

BY W. R. BASHAM, M.D.,

Senior Physician to the Westminster Hospital.

(*Continued from* p. 37.)

THE differential diagnosis between calculous disease of the kidneys and tubercular disease is not so well marked as might at first be imagined. In their pathology no two diseases can be more distinct. In their rise, progress, and result they are sufficiently well marked; but in the first and second stages of their development they exhibit two conditions in common—hæmaturia and purulent urine—which to the inexperienced or careless observer become a source of confusion and doubt, and can only be resolved by a careful estimate of the relation and sequence of these two symptoms to the general condition of the patient.

At the outset it may be remarked that in calculous disease even of long standing it is remarkable how the general nutrition of the body is maintained, and how little the aspect of the patient leads to the suspicion of any malady so little amenable to treatment as calculous disease of the kidney. It is otherwise in tubercular and scrofulous disease of these organs. There may not be any marked amount of emaciation in the first stage, but there is an unmistakable careworn look indicative of suffering from some deep-seated malady.

With the object of placing the differential diagnosis of calculous in comparison with tubercular disease, it is desirable to

recapitulate the typical symptoms of the first, in the order of their occurrence; for it is chiefly on this that in the earlier stage of both diseases a comparison can be made. The following are the typical symptoms of calculous disease in the order of their ordinary appearance. It must be recollected that all may not be present, or may be so trifling as to escape observation. The point of importance is the order of their succession.

Calculous Disease.

More or less lumbar pain or uneasiness; nephralgia, with frequency of micturition; urine sedimentitious; either uric acid in crystalline grains, rhombic, lozenge-shaped, stellar, or any of the various crystalline forms of uric acid; urates in excess, with occasional evidence of amorphous grit or gravel. Hæmaturia may subsequently be present, usually only detected by the microscope. A severe attack of poignant griping colic-like pain may indicate the escape of a calculus into, and its passage down, the ureter. The nature of these symptoms can never, or should never, be mistaken. A verification of the diagnosis sometimes is demonstrated by the passage of a concretion through the urethra. But all cases are not so typical in the succession of these symptoms as just described. Hæmaturia may be the starting-point, or the earliest symptom noticed. An accidental twist or shock or jar is referred to as the supposed cause. The patient is alarmed at finding his urine blood-coloured; and having had no antecedent nephralgia, or indications of urinary disturbance, it is on the first appearance of the hæmaturia difficult to assign its true cause.

It is here, at the commencement of the symptoms which mark the kidneys as the seat of the disorder, that the true differential diagnosis between calculous and tubercular disease is found. In those cases of calculous disease which at the outset show a disturbed state of the urine, with the presence of sand or gravel and some sympathetic sensations derived from the renal plexus, the diagnosis is clear enough. But there are many cases of this form of disease having no antecedent stage exhibiting a disposition to pass urine loaded with uric acid, amorphous or crystalline, which at once puts the observer on

the right track for correct diagnosis; but, on the contrary, without any warning or preliminary disturbance of the renal function, the patient passes sufficient blood to give a notable colour to the urine and alarm the patient as to the probable consequences of this symptom. It is utterly impossible from this single symptom to pronounce an opinion. It is only by the aid of successive symptoms that we eventually arrive at a correct and reliable diagnosis. Assuming that we are dealing with an example of hæmaturia caused by a calculus which has formed and grown without any previous indications of its existence till blood appears in the urine, the following are perhaps the most reliable conditions on which the calculous origin of the blood may be placed:—First, the amount of blood is not large—it is not continuous: that is, a few hours after the first appearance of the blood the urine approaches a natural appearance, and i is only by the microscope that blood-corpuscles, isolated, and not in *rouleaux*, can be detected. Usually with these may be seen more or less epithelium derived from the ureters and pelvis of the kidney. They may be recognised by their mononuclear and somewhat elongated shape. Many days may elapse before any further hæmaturia is noticed—even weeks may pass: but in this interval the appearance of the urine becomes safely diagnostic. I believe, from the experience of a great many cases, that the following conditions of the urine may be relied on as proof of a calculous origin to the disease:—There may be more or less frequency of micturition, but this is indicative of many other forms of renal disorder, and therefore cannot be relied on alone. But that on which reliance may be placed is the presence in increasing quantities of the mucus natural to the urine in health—ordinarily only forming a delicate cloud, which neither settles in a sediment nor is diffused through the fluid, but floats midway, as it were—incapable of imparting any cloudiness to the urine—when disturbed and diffused. This mucous cloud, in those cases of hæmaturia from calculus, gradually increases—even within a few days, when the hæmaturia has ceased, the urine set at rest exhibits a settlement of these cells: not as a precipitate such as occurs with pus cells, but as a cloudy haze hanging more or less suspended, but nevertheless with a well-defined upper surface. This mucous cloud, examined

by the microscope, is seen to consist chiefly of exudation corpuscles: mononuclear cells, spherical, and slightly cloudy, or even granular, when acted on by dilute acetic acid. As the proportion of mucus increases, the corpuscles assume an altered appearance: the nucleus becomes reniform, or even trefoiled; and as the corpuscles become more numerous, they become more or less characteristic of the pus cell. These conditions of the urine constitute the mucous or early stage of calculous pyelitis, slowly passing into the second or purulent stage. This recapitulation has been thought necessary for more direct comparison with the development and progress of the tubercular form of the disease.

Tubercular Disease.

Tubercular or scrofulous disease of the kidneys may be defined as a suppurative disease of these organs from deposit of tubercle within the substance or in the outlets of the organs, and in the majority of instances proceeding to a fatal termination without evidence of tubercular disease elsewhere. The tubercular deposit is sometimes confined to the ureters and urinary passages, being limited to the submucous layer of these outlets, and not necessarily extending to the kidneys. It is not possible during life to distinguish between tubercular nephritis and tubercular pyelitis.

The differential diagnosis between the calculous and tubercular forms has now to be considered.

There are three practical points for comparison:—the hæmaturia, in its extent and frequency; the purulent urine, in its sudden appearance and uninterrupted continuity; the progressive emaciation, with hectic fever, exhaustion, and death.

The hæmaturia in calculous pyelitis is occasional; in tubercular disease it is copious, and while the first stage lasts continuous—there being no intervals in which the urine is apparently free from blood.

In calculous pyelitis the purulent stage is slowly developed; the urine passing through a mucous stage of longer or shorter duration, succeeded by pus, which may be, from causes already explained, intermitting, and even for days absent altogether. In

tubercular disease, purulent urine succeeds the hæmaturia abruptly and almost immediately; there is no perceptible interval between the hæmaturia and the appearance of the pus. Moreover, the amount of pus in any given quantity of urine is far greater than is seen in the calculous form of the disease, and there is an amount of emaciation, accompanied by evening exacerbations of fever, never witnessed in the less fatal calculous form.

This stage of the disease is sometimes accompanied by the development of a renal tumour, the ureter becoming blocked by the increasing tubercular deposit in the sub-mucous tissue of the tube. If a careful analysis be made of the antecedent symptoms, and due weight given to the order of their succession, a correct diagnosis may be thus formed; the distinctive characters of the two forms being carefully kept in view.

In tubercular disease, the development of a renal tumour is always accompanied by frequent rigors and by drenching and exhausting night sweats.

These are rarely present in the calculous disease, and then only when the symptoms of perinephritis are present, the sequel of which is not necessarily fatal; a result, however, which must be certainly predicted in tubercular diseases of these organs.

Tubercular disease of the kidneys is not always accompanied by tubercular activity in other organs. Pulmonary phthisis and renal phthisis do not often run their course simultaneously. In very extreme cases of tuberculosis, however, tubercle may be diffused through all the chief organs of the chest and abdomen: the lungs disorganised by deposit, the intestines and mesentery infiltrated with tubercles, one or both kidneys the seat of the tubercular softening, the ureters the seat of a similar deposit extending to the bladder, infecting the prostate and even canal of the urethra, implicating both the membranous and spongy portions of the urethra in males, and infecting ureters, ovarium, and uterus in females, and thus carrying, by the agency of secondary deposits, the tubercular disease to the utmost limits of the urinary and generative apparatus. Such extreme diffusion of tubercular disease is certainly rare, for most commonly tubercular nephritis and pyelitis run a rapid course; it is usually limited to the kidneys, or at most the ureters, and after

death, no indication beyond a possibly ulcerative state of the pelvis of the kidney, or at furthest the infundibulum, is seen of tubercular activity in other organs.

The cortical part of the kidney is the usual primary seat of tubercle in this organ. It is in the form of yellow tubercle, and hence it usually runs a rapid and acute course.

Numerous yellow points are seen surrounded by an inflammatory zone, in the centre of which may be found a minute point of tubercular pus. In the same kidney may be seen usually tubercular spots in varying stages of progress, as—

1. Tubercular puncta with an inflammatory margin or zone.
2. Small cup-shaped cavities, containing a minute quantity of yellow creamy pus.
3. The fully developed tubercular abscess, scooping out and eroding into irregular hollows the base and substance of the cones; a true example of phthisis renalis.

The tubercular deposit may be confined to the cortical or even tubular portion of the organ, but in many cases secondary deposits invade the pelvis and even ureters. When involving the latter, a thickening of the walls and narrowing of the diameter of the canal, lays the foundation of an amount of obstruction to the escape of the pus and urine, which eventually terminates in a renal tumour, with its associated hectic and drenching sweats, rapid exhaustion, and death.

The purulent urine in respect of its microscopic character does not differ from the purulent sediment in calculous disease.

The presence or absence of a certain granular matter supposed to be characteristic of tubercle is not trustworthy. Crystals of double or triple phosphate will exist in both urines, and depend on chemical changes in the purulent urine. No microscopic test can establish a difference. The practitioner is therefore thrown back on the character and sequence of the antecedent symptoms.

The following may be accepted as the characteristic symptoms of a typical case of tubercular disease of the kidney. The general health is observed rapidly to fail; a sense of weight and uneasiness about the loins is experienced shortly before the presence of hæmaturia. Micturition becomes most painfully frequent. Rigors more or less marked indicate some obscure

internal mischief. Nausea and vomiting are not infrequent at this stage.

The early stage of renal tubercle is marked by a degree of suffering far in excess of what is experienced in calculous disease, excepting only the attack of renal colic from the passage of a calculus. The suffering in such cases is a paroxysm of renal colic of longer or shorter duration. The suffering in tubercle is continuous; unmitigated or only momentarily relieved by the passing a small quantity of the purulent urine accumulated in the bladder. There is a constant and most distressing pain felt at the back of the bladder, with a most urgent need to pass water. This will occur in very short intervals, in the most distressing cases every few minutes, at longest every hour or half-hour. This urgent frequency of the desire to pass water, with scarcely a longer interval of ease than a few minutes after micturition, to return with an agonising crushing pain at the neck of the bladder, with an irritable stomach and frequent vomiting, or at least nausea, with inappetency, often a loathing of food, sleep entirely banished, or only that obtained by the action of large doses of opiates, rapidly tell on the nutritive condition of the patient, and the loss of flesh and rapid emaciation plainly declare a marked contrast between this form of renal disease and that derived from calculous deposit. The treatment of this form of renal disease will be considered hereafter.

Reviews.

The West Riding Lunatic Asylum Medical Reports. Edited by J. Crichton Browne, M.D., F.R.S.E. Vol. IV. London: Smith, Elder, and Co., 1874.

At the present moment, when one is ever hearing so much, both within and without the profession, of the comparatively backward position which England occupies in the rapid advance of rational medicine and of science generally, it is sufficiently reassuring to open such a book as the one before us, and find on every page abundant evidence of the spirit whose absence some would have us to deplore. Of the twelve articles which the volume contains, some are replete with the details of extensive investigations by laborious observation and experiment, in the regions of histology, chemistry, physiology, therapeutics, and psychology. Such, for example, is Dr. Merson's paper on the "Urinology of General Paralysis," Dr. Major's fresh contribution to the "Histology of the Morbid Brain," and Dr. Robert Lawson's discussion of the question of the "Hourly Distribution of Mortality." The inseparable difficulty of want of space alone prevents us from quoting the chief results of these papers and many individual portions of them. Other articles, such as that of Dr. Milner Fothergill, on "Cerebral Anæmia," are the outcome of long and careful study of disease in the living subject. And in still another class the authors deal with certain subjects of clinical, scientific, or general interest, with a breadth of grasp and completeness of handling which could be expected only from extensive experience and mature thought.

It would be impossible within the limits of a short review to give an account, with any pretension to completeness, of even the purely therapeutical portions of these papers. We can quote only a few of the most *original* and important conclusions on subjects coming immediately within our special province, and therewith heartily recommend the volume to our readers.

Dr. Hughlings Jackson contributes a paper on "Recovery from Double Optic Neuritis," in which he insists, as he has done for years, that there may be no defect of sight when the appearances of optic neuritis are extreme; that, conversely, optic neuritis is frequent without defect of sight as a symptom; and that if the optic discs are not examined until sight fails, the early and remediable stage of neuritis may be overlooked, or the neuritis never discovered. Referring to the case of a male patient, syphilitic, who recovered from complete paralysis of the right third nerve in three months, and from all ophthalmoscopic evidence of an accompanying double optic neuritis within another month, Dr. Jackson says:—"The patient did not recover from amaurosis; he never had any amaurosis to recover from. He took very large doses of iodide of potassium. My opinion is that this treatment prevented amaurosis, but as I always give large doses of iodide of potassium in such cases, I cannot show more than a *post hoc*. Whenever I see optic neuritis I always give large doses of iodide of potassium."

In a paper on "Pathological Illustrations of Brain Function," Dr. Ferrier takes a number of fatal cases of cerebral disease, points out the relation between the symptoms *intra vitam* and the appearances found *post mortem*, and introduces experiments and other clinical experience by way of illustration. Dr. Ferrier's remarks on sensory auræ in epilepsy, on affection of consciousness without convulsion, and convulsion without affection of consciousness in aphasia, on the relation of pulmonary to cerebral disease, as well as on many other allied points, are worthy of most careful study.

Dr. Benham contributes a paper of great value therapeutically, inasmuch as it would appear to assist materially in the solution of the vexed question of the use of the ice-bag applied to the head in intracranial disease or disorder. The author has worked out his results from a series of very laborious and careful experiments on the human body, living and dead, and on the lower animals. We give the following short statement of the therapeutic action of cold when applied to the scalp:—"It causes a slight lowering of the temperature of the intracranial tissues by reflex action; a slight diminution of the temperature of the body generally by the direct action that cold has in lowering the temperature of the stream of blood passing through the capillaries in direct contact with it; and a slight decrease in the frequency of the heart's action;" and he adds, "a greater effect in the same direction may be more easily produced by other and less violent means."

According to Dr. Crichton Browne, in his article on "Acute Dementia," judicious treatment is abundantly rewarded in this disease. Besides the all-important hygienic measures, the use

of electricity is recommended in the form of the continuous current applied to the head. Of all drugs in acute dementia, quinine has been found most valuable by Dr. Crichton Browne, and he states that "guaiacum has likewise proved exceedingly useful" in his practice.

The conclusions at which Dr. Benham has arrived from a number of experiments on the "Action of Nicotine" are so far at variance with those of previous investigators and with the current views on the subject, as to demand the serious consideration of therapeutists. Dr. Benham's most important observation would appear to be that the effect of nicotine in fatal doses "is not to cause death by arrest of the heart's action." He is inclined to believe that it is to the respiratory apparatus we must look for the cause of death. "The effect of nicotine on the heart, when administered internally, or topically, is not to arrest its action, but rather to accelerate it and increase its power," and this partly through the vagus and partly through the intrinsic nerve-centres. Given internally, nicotine sensibly lowers the temperature. Administered topically or internally, it contracts the pupil. But it is important to remember that the action of nicotine is very different in different subjects.

The Maintenance of Health. By J. Milner Fothergill, M.D. London: Smith, Elder, and Co.

We owe our readers an apology for not having brought this book to their notice at an earlier period, for, though professedly written for the public, it contains much that is valuable to the practitioner: some truths which may be said to be new, and many old truths presented in so new and striking a light, as to be equivalent to a re-revelation.

Dr. Fothergill's method of teaching is not the didactic, which has a tendency to become wearisome. He shows rather how health is lost or thrown away, than how it is preserved. The book would indeed have corresponded more closely with its title had it been named "How to get Ill," instead of "The Maintenance of Health." A true key-note is struck at once—health is declared to be not a positive, but a relative condition. "You may as vainly look in the yard of a manufactory for a group of oaks or elms whose ring-recorded years go back to the days when Puritan rule had not yet modified the rude mist of England in the olden time, as look for those outward appearances which characterise the peasant of Cumberland and Westmoreland amidst the pallid denizens of Spitalfields. And yet because such is the case, it does not follow that the man of Spitalfields is not in health, in what is health to him." After an introduction in which condensed physiology is made positively interesting even to a pro-

fessional reader (the only instance of the kind we remember to have met with), the generation of the ills to which our unhappy race is heir is traced in childhood, youth, maturity, and old age. The narrative runs on from point to point so smoothly, enlivened here and there by a touch of humour or a grim joke, that there would be some danger of the desired impression not being made were it not that we are brought up at the end of each chapter by a series of hard and sharp propositions which we find to be the *main de fer* concealed by the *gant de velours* of a lively style. There are passages, too, which rise to the level of true and moving eloquence, as when the perturbations, physical and moral, attending the period of puberty and the evolution of the sexual instincts are depicted (pp. 58, 59). The picture of one aspect of advancing age again is one which has rarely been equalled; unfortunately it is the unfavourable aspect only, decay rather than decline, which has been painted, but we hope, in future editions, to see the companion picture traced with the same vigorous hand.

In a succeeding series of chapters the subjects of food and clothes and of stimulants and tobacco are considered. Here there is less room for originality either of idea or of treatment, but the pages are thickly strewn with pregnant hints and apt illustrations, and in the description of the effects of alcohol and of the causes and course of drunkenness there comes out the results of observation and thought in words expressive of true and deep feeling. In the chapter on Inheritance, which follows, but which might perhaps have more appropriately stood first, is given an account of various forms of inherited constitution, under the heads of the "gouty," "strumous," "nervous," "bilious," and "lymphatic diathesis." We find in this two grounds of quarrel with Dr. Fothergill. In the first place, he employs the term diathesis in too wide and vague a sense, and so destroys the precision of its meaning as accepted hitherto in medicine. He defines diathesis to be inherited constitution, whereas its recognised significance implies a *morbid* state or tendency of constitution inherited or acquired; and he rejects in its favour a word which is classical, and which conveys exactly the meaning he attaches to diathesis—temperament. This name, moreover, is associated with terms descriptive of varieties of constitution—sanguine, phlegmatic, choleric, and melancholic—which, in addition to the authority due to antiquity, follow more closely the lines of cleavage of physical and mental peculiarity of organisation than his own. A diathesis is a degradation of one or more of these types. Apart, however, from this misuse of terms, the chapter on Inheritance is most instructive and ought to be useful. Subjects are here boldly handled, which, familiar enough to medical men, are not often presented to the general reader, and require

to be treated with delicacy and discrimination. We should think it must make many people uncomfortable, for various reasons.

Perhaps the most original part of the book is the chapter on Overwork and Physiological Bankruptcy. This term "physiological bankruptcy" is not only a valuable addition to medical phraseology as a name, but is pregnant with meaning as a notion; and medical men will find themselves strongly reinforced in dealing with an intractable patient who is on the road to this condition, by the phrase which brings home to the individual a vivid conception of the state of things, and by the arguments and illustrations with which it is associated. Even to the well-informed practitioner the impressive description of the processes by which a man borrows from his constitutional capital, or draws a succession of bills on his future, cannot fail to be useful.

We have only to say of the remaining chapters on Hygiene, and on Emergencies of various kinds, that they contain much information pleasantly and lucidly communicated. The work as a whole we can most heartily commend; there are in it hasty conclusions and statements which require qualification, but few will fail to profit by a perusal of it. As we have said before, it is made interesting by much genial humour and by touches of real pathos: simply as a literary performance, indeed, it has merits of a high order. General readers to whom we have submitted it confirm this opinion, and ladies have appeared to find a fascination in it. Were it only for the chapter on Physiological Bankruptcy, the book ought to meet with success; but throughout it contains much which is calculated to be of service to both the public and the profession, and it deserves well of both.

Clinic of the Month.

The Treatment of Syphilis by Moist Mercurial Fumigation.—Mr. J. St. S. Wilders and Mr. J. R. Lane both discuss this subject. Mr. Lane objected, in a clinical lecture lately delivered, to mercurial fumigation, as being troublesome and dirty. Mr. Wilders calls this statement in question, and declares that fumigation is deserving of neither of these terms, but that it is cleanly, rapid, and manageable; the most powerful therapeutic agent in the removal of disease, and the least hurtful to the constitution of the patient. He records an instructive case. Mr. Lane, in reply, says that for years he has been in the habit of employing the various methods of treatment in turn (fumigation, inunction, administration by the mouth), and that he failed to find any special advantage in the method by fumigation. (*British Med. Journal*, Jan. 23 and 30, 1875.)

Treatment of Scabies.—Dr. Tilbury Fox remarks that slight cases in the upper classes are often overlooked. In such instances, one or two stray furrows may often be found on the fore part of the abdomen, the penis, the inner and upper part of the thigh, and the front of the fore-arm; moreover, the pruritus is only felt when the patient gets warm under the bed-clothes. In more severe cases, the disease often presents the aspect of a pruriginous eczema, or of phtheiriasis mixed with eczema. He thinks the cases of itch met with in private practice may very easily be over-treated, and thinks it wrong in such slight cases to apply the parasiticide all over the body. He only applies this to the affected parts, and uses a soothing lotion for the rest of the body. He never uses sulphur vapour baths, as they are apt of themselves to set up violent irritation in severe cases. Dr. Liveing also discusses the subject, observing that there are three principal methods of treating scabies: (1), by sulphuret of potassium baths; (2), by sulphur vapour baths; (3), by sulphur ointment: and is of opinion that the treatment by inunction of sulphur ointment is the most efficacious of the

three methods. The ointment should, however, be applied over the skin of the whole body except the head. The ointment of the British Pharmacopœia is too strong, especially for children. It should not be used for too long a period, lest it induce irritability of the skin. The whole body should be rubbed over with the ointment, the smell of which may be disguised by oil of sandal-wood; at night he should sleep in flannel drawers and jersey, and have a warm bath in the morning. (*Ibid.*)

The occurrence of Organic Forms in connection with Contagious and Infectious Diseases.—A course of lectures on this subject by Dr. J. Burdon-Sanderson is now in course of publication in the *British Medical Journal*. In his first lecture he describes the various forms of bacteria; their natural movements and mode of multiplication, their mode of action on the media in which they live, the method of cultivating them, and their influence on the process of putrefaction.

Treatment of Varicose Veins.—In a clinical lecture, delivered at University College Hospital, Mr. Marshall gives an account of a somewhat novel operation which he has performed for the cure of varicose veins. The patient, after standing for half an hour with a carbolised cloth round the left leg, was put under chloroform, and the course of the tortuous vein was marked with ink below the left knee for about nine inches. At each end of this mark, Mr. Marshall ligatured the vein by means of a pin passed under the vein with a piece of bougie, and a figure-of-eight section over the vein. Two other similar ligatures were placed above the upper one at distances of two inches apart, and a fifth ligature was placed two inches below the lower one. The pins, bougie, and threads had all been previously carbolised. Esmarch's elastic bandage was then applied to the whole limb, with the effect of completely emptying the varicose vein even in the intervals between the several pins. Mr. Marshall then made a straight incision through the skin in the line of the ink mark, and with a director and knife slit up the vein along the whole of the exposed portion. As the vein then formed a very large, irregular, folded mass at the bottom of the wound, he passed a ligature around it, above and below, and removed it entirely with forceps and scissors, cutting through two large veins opening into it. There was no bleeding. A strip of carbolised gauze was then placed in the wound, and the limb put up in the complete antiseptic dressing. The case was discharged, cured, in seven weeks. (*Lancet*, Jan. 23, 1875.)

Electro-therapeutics.—Dr. Vivian Poore continues his lectures on electro-therapeutics, and describes the cases of spas-

modic affection in which the application of electricity is likely to prove of service. He refers to the evidence given in the Guy's Hospital Reports, by Addison, Golding Bird, and Gull, of the advantage derived from the application of Franklinic Electricity (taking sparks along the spine) in the treatment of chorea, and cannot account for the disuse into which it has fallen. Dr. Poore has *not* seen any advantage follow the use of electricity in other forms of clonic spasms, as in stammering, the quivering of the muscles of the face, and the painful twitching of the limbs that occur after amputation; but he has found it serviceable in tremors arising from various causes, and in writer's cramp and other similar forms of disease. (*Lancet*, Jan. 23, 1875.)

Conservative Surgery.—Mr. Bryant, in a communication to the *Lancet*, endeavours to show, and adduces many cases in proof of the following propositions:—(1) That in cases of disease or accident, no more of the body is to be taken away than the necessities of the case demand. (2) That to carry out this principle the surgeon may in *pathological amputations* fearlessly divide tissues infiltrated with organised inflammatory products, and even cut through the walls of suppurating cavities, or through diseased joints. (3) That in *accidental surgery*, parts irreparably injured are alone to be removed, and no healthy tissues are to be sacrificed in order to perform a recognised and probably named operation. That to these ends the surgeon ought to utilise even doubtfully viable integument, or even leave a stump to granulate, when by doing so some portions of the shaft of a bone can be left, a joint saved, or amputation above a joint avoided. (*Ibid.*)

Treatment of Bronchocele.—Dr. Gibb recommends the division of the isthmus of the thyroid gland in cases of dyspnœa resulting from its enlargement. He records several cases in which it proved serviceable, and describes the mode in which the operation should be performed. (*Ibid.*)

Treatment of Gleet.—Mr. Berkeley Hill, in a clinical lecture on this subject, describes the various methods in common use. Thus, in an ordinary case, arising from antecedent clap, he uses Guyon's Injector, and throws in two or three minims of a solution of nitrate of silver, containing ten to twenty grains to the ounce, or strong solution of perchloride of iron, and then prescribes rest. A weak astringent injection should be used for three or four days, when the caustic solution may be employed as before. He describes with approval the mode of using the *porte-rémèdes Regnal*, which consist of bougies of gelatine, covered with mucilage, impregnated with the astringent

or other medicament, as opium or belladonna; this the patient passes in before going to sleep, and by the morning it has dissolved away. He has tried and points out the dangers of treating Dr. Otis's "strictures of wide calibre" by incising them with a peculiar form of bougie with concealed blade. Some gleets result from warty vegetations usually situated in the fossa navicularis. These should be exposed by means of the endoscope, and cauterised off with nitrate of silver. Gleet arising from inflammation of the glands along the floor and sides of the urethra should also be treated by cauterisation, a catheter stylet being applied armed with the nitrate of silver. Gonorrhœa in hypospadias is very difficult to cure completely, owing, he thinks, to the number of glands about the orifice of the meatus. He then enters very fully into the treatment of prostatic gleets, which he conducts upon good general principles. He has found little benefit from drugs, but if there is much pain, gives anodyne suppositories of belladonna, morphia, and camphor, and administers small quantities of copaiba, or tincture of cantharides. Local treatment is very important, as by the direct application of leeches through the anus to the prostate, or the free application of iodine paint. (*Lancet*, Feb. 13, 1875.)

Treatment of Laryngitis by Veratrum Viride. — Dr. Handfield Jones records the case of a night nurse, aged 24, who on July 27, 1874, was attacked at night with sore throat. The next morning the dyspnœa was so great as to make it probable that tracheotomy would be required. Some leeches were applied with relief. When seen by Dr. Jones she was suffering much, but breathing fully and deeply. The respirations were 21; temperature 102; pulse 120. Laryngoscopic examination was very difficult, but the epiglottis appeared to be normal, the larynx reddened, and the chordæ close together. The diagnosis was laryngeal catarrh, with great hyperæsthesia of the sensory nerves; and Dr. Jones recommended a dose of chloral, and Graves' hot sponge to the throat. At 4 P.M. she was somewhat but not much better; voice rather hoarse; much anxiety of facial expression. Four minims of tincture of veratrum in a little water were now ordered every hour. Seven doses were taken when sickness came on, but she took two more doses at intervals of several hours. Next day she was much relieved. She was placed in a steamed tent. The laryngitis was succeeded by a good deal of pneumonic congestion, but all danger was at an end in three days. Dr. Jones comments on the free respiratory movements that were present during the height of the disease, and considers that they were due to the swelling of the laryngeal membrane not being sufficient to obstruct materially the ingress of air, while the impressibility of the afferent nerves of

the mucous surface was so much increased by the morbid process that the motor nerves were excessively stimulated and the inspiratory muscles acted with unusual energy. (*Med. Times and Gazette*, Jan. 9, 1875.)

Infantile Convulsions.—Dr. H. B. Clarke, of New Bedford, Massachusetts, comments on a case recorded by Sir John Rose Cormack, in which a patient was apparently restored from a state of suspended animation by the touch of a finger thrust into the aperture of the larynx. He records a similar case in which a rather delicate child, of seven years of age, after a day or two of slight indisposition was seized with convulsions whilst playing in the garden. She was at once placed in a warm bath. An hour after, when seen by Dr. Clarke, she was still somewhat convulsed, but immediately afterwards she sank, pallid, relaxed, and apparently dead. Artificial respiration was at once undertaken and continued for some minutes without apparent effect. When about to abandon the case as hopeless, it occurred to him that possibly the tongue had not been drawn forward sufficiently to secure the passage of air through the larynx. In an attempt to ascertain the condition of the larynx in this respect, he passed his finger along the side of the tongue until he got the tip within the laryngeal opening, which he had no sooner done than a gasping inspiration was made which soon developed into regular breathing. Two or three weeks later another paroxysm occurred, but, Dr. Clarke being away, considerable delay occurred before another medical man could be found, and in the interval the child died. Dr. Clarke states that he has seen good results from a similar method of treatment in cases of a patient apparently dead from chloroform and the inhalation of nitrous oxide gas, and of another in which animation was suspended from convulsions dependent on dentition. (*Medical Times and Gazette*, Jan. 16, 1875.)

Rhamnus Frangula as a Substitute for Castor Oil.—Dr. Ogilvie Will, of Aberdeen, whilst accepting the general view that castor oil is as efficient and safe as any of the laxatives in the Pharmacopœia, dwells upon the well-known objections to its use. He then points out that his observations do not refer to the *Rhamnus catharticus*, or buckthorn, but to the *Rhamnus frangula*, or black alder. The part used is the bark, from which a fluid extract is obtained, each fluid drachm of which contains an equivalent of one drachm of the bark. This extract is a dark-brown, thick fluid, with a sweet and agreeable taste. The dose varies from one to two drachms for a child. It causes no nausea, no eructations, and no griping. The stools are not in general loose, and never watery; it usually only acts once. It seems to have, in addition, tonic and aromatic qualities by

which the muscular action of the bowels is slightly stimulated. It is particularly serviceable in children, in those suffering from haemorrhoids or other affections of the rectum; after surgical operations about the pelvis or abdomen; in inflammatory or spasmodic diseases of the genito-urinary organs; in pregnant and puerperal females, and generally in all circumstances in which it is desirable to move the bowels gently without occasioning local irritation or general disturbance. (*Med. Times and Gazette*, Feb. 6, 1875.)

Cold Water and Antiseptic Treatment of Typhoid Fever.—Dr. Henry Blanc recapitulates the method of treatment adopted by Brand for the cure of typhoid fever, which consists in the administration of cold baths, cold drinks, and cold enemas; and, admitting that this plan proves very efficacious, considers that additional advantage may be gained by the simultaneous internal administration of substances which arrest the growth or destroy the vitality of morbid germs. The subchloride of mercury or iodine are both powerful antiseptics, and they have a special action in effecting the early subsidence of the disease. Other antiseptics, such as the sulphate of quinine, dilute sulphuric acid, the chloride of aluminium, may also be employed in typhoid fever, since they combine antiseptic and tonic properties. He points out the advantages of the double treatment by cold and antiseptics in malarial remittent fevers. (*Lancet*, Feb. 6, 1875.)

The report of a paper on *Temperature in Phthisis*, read at the Royal Medico-Chirurgical Society, by Dr. C. Theodore Williams, is contained in the *Lancet* for Jan. 30, 1875; and in the same number of this journal are, a clinical lecture on the *Relation of Tubercle to some other affections of the Testis*, by Mr. Savory; a clinical lecture on *Phthisical Laryngitis*, by Dr. Sawyer; and an account of the *Autopsy of the Tring Centenarian* who had attained the age of 111 years.

Extracts from British and Foreign Journals.

Alcohol and Energy.—Dr. Douglas Morton considers that alcohol has been shown by Binz and Anstie to undergo combustion in the organism, and must therefore, according to the law of conservation of energy, contribute energy to the body. In support of this he gives the following observations :—

"During four or five years past I have had much to do with chloroform administration, but until about two years ago had never made it a special point to give alcohol before applying the anæsthetic. Up to this time it had not been an unfrequent occurrence for a patient to show a dangerous tendency to death by what was evidently depression of heart-power, and it very often happened that nausea and vomiting, sometimes to a degree really serious, followed ; phenomena which certainly have some sort of very close connection with heart asthenia. Since I made it a rule to give alcohol in some form or other, I have seen no bad effects, not a single case that I recollect even of vomiting.

"My sole criterion as to the amount of alcohol that ought to be given is the estimate I form of the susceptibility of the individual to its influence. I am induced to make this statement by the fact that Mr. Clover, the great authority on chloroforming in London, seems to apprehend danger from its use. He says, in the February number of the *British Medical Journal*, 'I like to give a tea-spoonful of brandy, without water, a few minutes beforehand, but not so much as a table-spoonful.' I have generally given whisky, and to adults rarely, if ever, in less quantity than a table-spoonful, and often as much as two ounces. I usually give it fifteen or twenty minutes beforehand, so that the patient may have ample time to get fairly under its influence. In the article referred to, Mr. Clover lays stress on the importance of having the stomach empty when chloroform is to be given, and it appears that it is to secure this condition that he gives alcohol in so small a quantity.

"It is obvious, however, that (with no difficulty in the way of its absorption) by giving the alcohol a longer time beforehand

a larger amount may be absorbed, and the patient may thus enjoy its beneficial influence in a greater degree, and at the same time be under the truly favourable condition of having an empty stomach."

He also finds that alcohol is a much more reliable agent than ergot in cases of parturition where the action of the uterus is slow and insufficient, and that it counteracts the effects of anæsthetics in weakening the uterus, and thus prolonging labour and increasing the risk of post-partum hæmorrhage. (*American Practitioner*, vol. x. p. 324.)

Treatment of Suppurating Ovarian Cysts.—Mr. Keith records a series of cases with the view of showing that operation ought to be the rule of practice in cases of acute suppurating cysts, or when typhoid symptoms supervene after tapping. In some of these cases the patients were *in extremis*, yet in a large proportion recovery took place. One was a woman of 35 years of age, in whom an ovarian tumour was detected in 1869. Early in 1870, most severe abdominal pain was experienced. Loss of flesh and rapid growth of the tumour followed, and in this state she continued for eighteen months. Her pulse was then 156, temperature 103°. Her girth at the umbilicus, 46 inches; the lower part of the tumour felt solid, but fluctuation was distinct above the umbilicus. It was evident there were adhesions. On tapping being performed, three gallons of pus came away: relief followed, and pulse and temperature fell. In three weeks the cyst had refilled. Ovariotomy was performed in July 1871, under ether. The incision extended from the umbilicus downwards eight inches. The wall was much thickened, the peritoneum of almost cartilaginous hardness, and all the parts highly vascular. The upper cyst was emptied of its purulent contents; the lower semi-solid portion thoroughly broken down, and the cyst-walls, weighing 18 lbs., dragged out. The tumour was everywhere firmly adherent; all bleeding points were tied with Lister's ligatures, a broad thick pedicle secured by a clamp, and the wound closed with silk ligatures. Great prostration followed the operation, but fortunately there was no vomiting. In the evening she was tolerably warm, flatulence was troublesome, and there was much thirst. Improvement gradually set in, but in the third week there were pain and swelling in the right iliac fossa, and fluid formed; the swelling was punctured, and a teacupful of yellow serum was removed by a syringe. In five weeks she returned home, and is now a strong, healthy woman. The other cases are of equal interest. In all those that were acute there was pain or tenderness somewhere on pressure. In all the pulse was rapid and feeble; exhaustion and emaciation were

great. The temperature, as a rule, was very high, varying from 100°—102° in the morning to 103°—105° in the evening. In one of the acute and in one of the chronic cases there were no adhesions. In five cases the pedicle was treated by the clamps, in five by the cautery. One death followed each method from blood-poisoning about 60 hours after the operation. In only two did typhoid symptoms come on quickly after tapping, and in one case tapping was had recourse to in the hope of relieving pain. The simple tapping Dr. Keith thinks had probably little or nothing to with the after-suppuration. The statement that when there is pain or tenderness this generally arises from inflammation of the peritoneal surfaces, appears to require modification; the reverse is oftener the case. Tenderness or pain, if long continued, is almost a certain sign that irritation is going on in the tumour somewhere. Simple surface tenderness, causing surface adhesion, rarely lasts long; and the worst cases of adhesion met with have often no history either of pain or tenderness. (*Edin. Med. and Surg. Journ.*, Feb. 1875.)

Injection of Quinine into the Trachea in Severe Cases of Intermittent Fever.—In the volume of "Lectures on the Anæsthetics," just published by Claude Bernard, he records several remarkable cases of severe intermittent fever cured by M. Jousset, of Bellesme, by means of injections of strong solutions of quinine into the trachea. The point of the cases is that absorption takes place with great rapidity from the mucous membrane of the respiratory passages, and that the injection is not accompanied by any irritation. In such cases the state of the circulation in the skin forbids the hope that any beneficial effect will result from subcutaneous injections. The following is one of the cases given, somewhat abbreviated. A man, aged 45, of strong constitution, attacked for a month with diarrhœa, and suffering from quotidian fever. On the 21st of September the diarrhœa increased, and vomiting occurred. On the 22nd, the patient was in a very serious condition: the face anxious, the eyes deeply sunk, the cheeks prominent, and the lips cyanosed. The body covered with a viscous sweat, the skin cold, even on the thorax. Respiration difficult and wheezing. Pulse scarcely sensible; very slow. The patient had taken a little quinine, but had rejected it immediately by vomiting. No drink could be tolerated. The liver and spleen very large. The impossibility of administering the quinine in the ordinary way, and the fear that it would not be absorbed from the skin, led M. Jousset to think of giving an intra-tracheal injection. The patient was accordingly propped up on cushions, the head being well thrown back. The neck, which was long and very thin, was thus sufficiently extended. The larynx was fixed with

the left hand, and the trocar of a small hypodermic syringe was plunged into the trachea in the median line, about a finger's breadth below the cricoid cartilage. The act of penetration was effected with the greatest ease; the sensation conveyed to the hand when the point entered the cavity of the trachea being similar to that experienced when a pin penetrates a thick sheet of paper. The syringe was now screwed upon the trocar, and a hundred drops of a solution of quinine were slowly injected. No effort at coughing was produced, nor did the patient experience any painful sensation. He was immediately placed in the recumbent position, and felt relieved. At the end of eight minutes he had a buzzing in his ears; at the end of twelve minutes the sweating ceased; at the end of eighteen minutes manifest improvement set in: the pulse became more perceptible, and could be counted—it was 52. After the lapse of half an hour the appearance of the man was so much altered for the better that he was scarcely to be recognised. The natural heat of the skin had returned, and the patient drank freely, without rejecting any of the fluid, and he swallowed a dose of fifteen grains of quinine. An hour afterwards he was able to rise and walk about, though feeble. The pulse rose to 88, and two hours after the injection he ate some rice and meat. In the evening recovery was complete. Quinine in small doses was prescribed for several days. The little wound healed readily, and there was no ecchymosis. (*C. Bernard's Leçons sur les Anæsthétiques et sur l'Asphyxie*, 1875.)

The application of the Thermometer in Surgery.—M. Rochard, after dwelling on the singular neglect that prevailed for so many centuries in the precise observation of variation of temperature in disease, notwithstanding that attention had been directed to it by Boerhaave, V. Swieten, and others, proceeds to give a short historical account of the mode in which it has now been rendered common by the labours of Traube, Wunderlich, and Bärensprung, and then details the results of his own inquiries. He has found that wounds, if of a certain extent and not produced by fire-arms, are almost immediately followed by notable increase of temperature, as was first shown by Mr. Senior, the rise amounting to nearly 2° Fahr., and lasting for two or three days. In compound fractures the period of defervescence is rather slower in making its appearance; the elevation takes place even when the injury to the nervous system has been very great, as in cases when the patient has fallen from a high scaffold. On the other hand, severe injuries caused by the explosion of a shell are invariably followed by depression of temperature, the amount of depression varying from 1·5° to 4° or 5° Fahr. in thirty-eight subjects of such injuries under the care of M. Demarquay, in

one case being as much as 10° Fahr. The fall was greater in injuries resulting from the explosion of a shell than in those caused by bullets, and more marked in men of forty years of age than in those of twenty. It was greatest in those addicted to habits of intoxication. All those in whom the temperature fell 4° Fahr. died, whether they were operated on or not. Penetrating wounds of the abdomen and strangulation of the intestines cause great depression of temperature. The lowest temperature noticed above, in which the temperature fell to 93°, was that of an officer who was struck by a fragment of shell which fractured his femur and opened the abdominal cavity. The temperature does not fall unless the peritoneum has been opened, and the thermometer in such case becomes an aid to diagnosis. By its means a case of intussusception can be diagnosed from one of strangulated hernia. Küss, Demarquay, and Billroth have observed that a fall in temperature occurs in extended burns. The accidents consecutive upon injuries, whether of a febrile nature or neurotic, are invariably accompanied by an elevation of temperature. Billroth has paid particular attention in this respect to traumatic fever, and finds that the so called *febricula* usually appears about twenty-four hours after the injury, and that it is characterised by a rapid elevation of temperature, which attains its maximum between the third and sixth day. This maximum rarely rises as high as 105° Fahr. The acme, which is usually of short duration, occurs in the evening, and the period of defervescence is sometimes rapid, sometimes slow, and sometimes interrupted by evening exacerbations. The prolongation of the acme or the recurrence of strong exacerbations should arouse suspicion of some internal inflammation or of the invasion of pyæmia. *Erysipelas* gives the most graphic tracing. The augmentation is sharp, the period of elevation uniform and prolonged for three or four days, and the defervescence sudden. In *purulent infection* the augmentation is also sudden, and the thermometer rises to a high point, running up to 106° Fahr. or more, but the acme is very short and the defervescence rapid. Then follows a fresh accession, and then the tracing gives a series of waves with high crests and deep sinuses. In the twenty-four hours that precede death the remissions no longer occur, and the temperature gradually rises and keeps at 105° or 106° Fahr. These characters permit pyæmia to be diagnosed by this means from the fever of suppuration and hectic fever. The temperature rises to its highest point in *tetanus*. Wunderlich and Billroth have remarked the occurrence in this affection of sudden and high exaltation of temperature in the course of a few seconds, rising in some instances to 108° or more. All conditions which interfere with the circulation in a slow and progressive manner cause depression of temperature. This may

be observed in chronic alcoholism and in uræmia. The thermometer may be applied to determine local variations of temperature, and thus afford assistance in diagnosis. Thus, arterial aneurysm causes a very appreciable elevation in the affected member, amounting to from 1·5° to 4·5° Fahr., and it is more marked the greater the distance from the aneurysm the temperature is taken. The same fact has been noticed, though to a less degree, by Monneret and others in cases of arterio-venous aneurysm. (*Bulletin Générale de Thérapeutique*, 1874, p. 400.)

Pathology and Histology of Lupus.—H. Essig refers to the investigations of previous observers in regard to the nature of this disease, amongst whom some regard lupus as a hypertrophy or granulation process taking place in connective tissue: others consider that it takes origin from or in the cutaneous glands: whilst others, again, regard it as a local tuberculosis. He is unable, from careful observations made on fifteen cases, to coincide completely with any of these views. Vertical sections through the whole thickness of the cutis gave him an insight into the relations existing in this disease between the epithelium and the connective tissue. The first two preparations examined were cases of lupus of the hand; in both the corium was found to be infiltrated with a large number of round cells, which followed the track of the vessels, and arranged themselves in a stellate manner in heaps around them. Other preparations of the disease as it appeared in the arm, thigh, face, &c., showed that the tissues were infiltrated with round cells, but without any circumscribed masses. In one instance long processes of the Rete Malpighii dipped down into the subjacent tissue. In another case some characters of the growth resembled those of spindle-celled sarcoma. In others masses of spheroidal cells appeared surrounded by a crown of vessels, the whole being imbedded in a reticulum in which characteristic giant-cells were visible. In others, again, though the disease had been diagnosed as lupus, microscopical examination showed that they were cases of epithelial cancer which had caused great destruction of the parts affected. (*Centralblatt für Chirurgie*, No. 2, 1875.)

Therapeutical Action of Iodide of Potassium.—Dr. Kämmerer, of Nurnberg, observes that the researches of Hoppe Seyler have shown that the oxygen of the blood is loosely combined with the constituents of the red corpuscles, and disposed to quit them when exposed to the action of any agent possessing only a slightly stronger affinity for it. Whether ozone is to be regarded as a permanent or transient constituent is still a moot question; it is however certain that the peculiarities of the oxygen of the blood closely resemble those of ozone, and reactions occur in the blood which ozone alone gives out of

it. It is generally known that iodide of potassium and starch paste constitute one of the best tests for ozone, because by the action of the ozone on the salt the iodine is set free, which colours the mixture of a deep blue tint. If we now follow the chemical changes and actions which iodide of sodium must necessarily undergo and exercise in its passage through the circulation, it is to be noted that it undergoes no change in the stomach, for whilst on the one hand the extremely dilute hydrochloric acid of the gastric juice is incapable of decomposing it, so on the other it neither precipitates nor is decomposed by the albuminous compounds, sugar, starch, and salts, that are or may be present in that organ. It then enters the blood by diffusion in an unaltered state; but even were the iodide decomposed by the hydrochloric acid of the gastric juice to some extent, it would only result in the entrance of hydriodic acid instead of iodide of potassium into the blood, the action of which would be similar. The large quantities of carbonic acid which are continuously produced in the blood will immediately act on the very dilute solution of the iodide in the blood, especially at the high pressure under which the gas exists in the blood. Hydriodic acid is set free with the formation of the bicarbonate of the alkali. The acid is, however, immediately broken up into iodine and water. Thus, by the direct action of the oxygen of the blood upon the iodide of potassium, iodine must be set free. If we now follow the action of the iodine now become free, upon the constituents of the blood, we find in the first place that no action takes place, so far as regards the inorganic constituents, upon the alkaline bicarbonates. It is upon the organic constituents of the blood that the iodine exerts its influence, and most powerfully upon those which are of most complex composition. Hence any miasmatic compounds and ferments are first affected, then fibrin and the analogous albuminoid compounds, whilst the fats are attacked with least facility. The action of iodine depends, like that of bromine and chlorine, upon its affinity for hydrogen, which it displaces from the compound, and unites with to form free hydriodic acid. The molecules of hydrogen withdrawn from the compound is at the same time replaced by one of iodine. But this new compound, being unstable, immediately breaks up, and the secondary products readily undergo oxidation. In the same way the hydriodic acid dissolving in the blood itself undergoes oxidation, and the iodine is again set free to pass through the same series of changes. A single molecule of iodine may thus aid in the decomposition of many molecules of organic matter, which explains the action of small doses of it. But, besides the iodine, there is another compound resulting from the decomposition of iodide of potassium, namely, potassium peroxide, which is not decomposed by

iodine: this acts as a strongly oxidising agent upon organic compounds, by which it is reduced to the condition of potash, which again unites with carbonic acid gas to form the carbonate. Thus the action of iodide of potassium is partly referable to the action of the iodine resulting from its decomposition in the body upon organic compounds, and partly to the action of the peroxide of potassium upon the constituents of the blood, the oxidation of which it facilitates. (*Virchow's Archiv and Der praktische Arzt*, Jahrgang xv. p. 81.)

The True Neck of the Femur, its Structure and Pathology.—A good paper on this subject appears in the *Boston Medical and Surgical Journal*, by Henry J. Bigelow. The author, after referring to the investigations of Wyman (1850), of Meyer (1867), Wolff (1870), and Merkel (1874), describes an osseous plate continuous with the back of the neck and reinforcing it, plunging beneath the intertrochanteric ridge in an endeavour to reach the opposite and outer side of the shaft. It plainly adds a certain strength to the bone. It is feebly developed in childhood and atrophied in age. He describes the various forms of fracture of the neck and the treatment that should be adopted in each case. (*Boston Medical and Surgical Journal*, Nos. 1 and 2, 1875.)

Herpes.—A good series of papers appears in the *Indian Medical Gazette*, from the pen of Dr. Garden, in which he enters very fully into its pathology, varieties, and treatment. The same journal contains a series of lectures on the vasculo-cardiacs by Alexander Crombie, M.D.; the first three lectures being occupied with the consideration of the action of digitalis.

Rheumatism and Neuralgia.—Dr. J. E. Jackson finds that the *shortest* cures of rheumatism are by the opium and alkaline treatment, together with veratrum *viride*, in all cases of the *acute* and sub-acute forms where the pulse needs controlling. Morphia, quinine, hyoscyamus, and chloral hydrate in appropriate doses, and according to the part affected, have been his most successful remedies in neuralgia, together with vesication, Granville's lotion, or equal parts of chloral hydrate and camphor combined, and painted or rubbed over the seat of pain. He has prevented the attacks in several cases of recurring hemicrania by using the following prescription:—

℞ Liq. potas. arsenit. f. ʒij
Hall's sol. strychniæ, f. ʒvj
Morph. sulph. gr. ij. M.

Take ten drops three times a day in water after eating. Dr. Senderling has found obstinate cases of sciatica cured in

relieved by pil. iodoform. et ferri. (*Trans. of the Med. Soc. of the State of Pennsylvania*, vol. x. pt. i., pp. 243 and 277.)

Action of Asarum Canadense.—Dr. P. R. Palm reports a case where abortion was produced at the third month by a strong decoction of the root of Asarum Canadense. There was neither vomiting nor purging such as would have followed the use of Asarum Europæum or Asarabacca. From this and other cases it appears that the Canada root is not so harmless as is usually supposed, and it is frequently confounded with Asarum Europæum by some apothecaries. (*Ibid.* p. 277.)

Effect of Tobacco on the Nervous System.—Dr. Brumbaugh writes:—"I have noticed for several years a growing tendency to nervous affections and mental disorders. Partial paralysis, in which the integrity of a portion of the sympathetic or ganglionic system of nerves is involved, has been quite common in my practice. From observations carefully made I am constrained to attribute this tendency to the effects of the use of tobacco, as it is largely associated with the tobacco habit. Mental derangements from dyspepsia, which is attributable to the same cause, are also largely on the increase." (*Ibid.* p. 270.)

Use of Cyanides in Acute Rheumatism.—Dr. A. Luton has employed cyanide of zinc and cyanide of potassium in doses of 5 to 20 centigrammes ($\frac{3}{4}$ grain to 3 grains) daily, with excellent results. They greatly shorten the duration of the disease and diminish the risk of complications. He prefers the cyanide of potassium to that of zinc. The cyanides are rapidly eliminated, so that if given in small and repeated doses there is less danger of any unpleasant results arising from their poisonous action than might have been supposed. The symptoms of their physiological action are frontal headache, nausea, colic, and sometimes slight diarrhœa. Generally the stomach is stimulated, the appetite increased, and digestion well performed. (*Bull. Gén. de Thérapeutique*, Jan. 1875, p. 1.)

Physiological and Therapeutical Action of Ipecacuanha and Emetine.—Dr. Polichronie has made a series of clinical observations on this subject, as well as researches in the laboratory of M. Vulpian. The former confirm the results of M. Chouppe. The conclusions of Dr. Polichronie are—

1. Emetine is the true active principle of ipecacuanha, which owes all its physiological, therapeutical, and toxic properties to the presence of this alkaloid.

2. In dysentery and diarrhœa, ipecacuanha, administered in enemata, acts as energetically as when given by the mouth.

3. Ipecacuanha enemata form one of the best means of treat-

ing infantile cholera. They may be used for a considerable time without weakening the youngest subjects.

4. In all stages of tubercular diarrhœa, ipecacuanha enemata give the best results.

5. The same treatment may be advantageously used to arrest profuse sweating in phthisis.

6. Emetine is a powerful poison. It kills in two ways; sometimes by causing nervous prostration, at other times when given in smaller doses by inducing intense gastro enteritis.

7. Two hypotheses may be advanced to explain the useful action of ipecacuanha in diarrhœa:—

(*a.*) A constringing action on the vessels, leading to a diminution in the abundance of the secretion.

(*b.*) A counter-irritant action from the inflammation of the mucous membrane.

8. Experiments upon the nerves of the submaxillary gland and upon the blood-pressure seem to show that it does not exert any constringing action on the vessels.

9. The production of inflammation of the gastro-intestinal mucous membrane, and the long time after which vomiting occurs, seem to favour the second hypothesis.

10. Emetine produces vomiting at the time when it is being eliminated by the mucous membrane of the stomach. This is proved by the retardation of vomiting or its entire absence after section of the vagi. In this it acts quite differently from apomorphia and tartar emetic, both of which cause vomiting with equal rapidity after section of the vagi as before.

11. Physiological and chemical investigations of the remedy tend to show that emetine is eliminated by the gastro-intestinal mucous membrane.

12. Emetine has no direct action on the nervous centre for vomiting, as is shown by its effects when injected directly into the arteries of the head.

13. From these considerations it may be concluded that in diarrhœas emetine acts by substituting for pathological inflammations an inflammation which tends to spontaneous cure. Its action in these conditions may therefore be compared to that of purgatives or nitrate of silver.

14. To explain its effects in sweating, we cannot admit a vaso-motor action, and we are obliged to believe either that it tends to dry up the secretion of the sweat glands while undergoing elimination by them, or that it acts through the changes it produces in the intestinal tract. (*Thesis quoted in Bull. Gén. de Thérap.*, Jan. 1875, p. 46.)

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*** Any of the foreign works may be procured on application to Messrs Dulau, of Soho Square, W.C.; Williams and Norgate, of Henrietta Street, Covent Garden, W.C.; or Bailliere, of King William Street, Charing Cross.

Department of Public Health.

FURTHER REMARKS ON THE PERIOD OF INFECTION IN EPIDEMIC DISEASE.[1]

A NOTICE of Dr. Squire's first paper appeared in No. lx., p. 406, of the *Practitioner* for June 1873. The new facts collected since that paper was published, though not very numerous, are important; they support and define many of the positions already assumed by the author, illustrate the latter limit of infection in scarlet fever, and supply details of the incubation of diphtheria.

A remark of Sydenham's, "that no one as yet had sufficiently studied the various and accurate methods Nature useth in generating diseases," continued in force to our own day. The starting-point of the present inquiry is from "An Essay on the Periods of Incubation of the Various Morbific Agents or Germs: addressed to the Central Board of Health, by George Gregory, M.D., Physician to the Small-pox Hospital." This was published during the cholera epidemic of 1832. Of small-pox he says the Small-pox Hospital had afforded abundant evidence that the period of incubation was twelve days; or fourteen, "counting, as I always recommend should be done, from exposure to the *appearance of the eruption*." He establishes the possibility of variation in this period by cases in which the

[1] Read before the Epidemiological Society of London, Feb. 18, 1875.

longest interval following upon a single exposure was fifteen days; the shortest under the same condition was twelve days.

These cases show for small-pox what appears to be true for measles, that a single definite exposure is often followed by an irregular incubation period, instead of serving to fix the normal period. Dr. Murchison's cases contributed to the St. Thomas's Hospital Reports indicate a similar possibility in other fevers.

The incubation period of measles (*Morbilli*), rubeola, varicella, and mumps, as previously demonstrated, follows closely that for small-pox, but in mumps with less uniformity, this sometimes extending to three weeks. Rubeola, so prevalent last summer, was now proved to have an incubation period closely corresponding to, but slightly in excess of, that for measles. This long time of incubation distinguishes it broadly and absolutely from scarlet fever; it is also a cause of the source of the exanthem being so often overlooked and the eruption attributed to cold, heat, fatigue, or food, instead of to the infection on which the form of rubeola known as *Roseola æstiva* is always dependent.

The scope of Dr. Gregory's subject precludes remarks on the duration of personal infection in convalescents. An example of it, however, is seen in his first case. Mary Argent was discharged convalescent from the Small-pox Hospital, July 6th, 1830. She slept that night with her sister, Susan Argent, who sickened for the small-pox, July 19th; the eruption showed itself July 21st. Further experience at the hospital has obviated this danger. Mr. Marson says that some time ago convalescents from the Small-pox Hospital were followed to their homes, and inquiries made for two or three weeks after their return, without finding a single instance of the disease being thus occasioned. Have typhus convalescents been similarly watched, to see if their return to homes and occupations had or had not given rise to new cases? One instance of this has come under notice; this raises a doubt whether the infection of typhus ceases so soon after convalescence as was inferred from the limited sphere of observation in the London Fever Hospital, where typhus patients make no long stay after their rapid convalescence. In the late epidemic at Carlisle, typhus

was communicated in this way, and also by fomites; in neither case was the infection conveyed from the Fever Hospital.

It is not contended that personal infection lingers as long in typhus as in scarlet fever; these two diseases are placed in different categories in this respect; but even if the duration of infection in typhus be comparatively short, its limit is not the less in need of definition.

For diseases of a long incubation period, as typhus, typhoid, small-pox, measles, and mumps, infection would seem not to continue long after the special morbid process of each disease is completed. Three weeks from the height of the eruption in small-pox and measles suffices for the cessation of personal infection, allowance being made for delay from complications; care is required that no effete remnant of a morbid action already over, clinging to the skin or to articles of clothing, should convey a disease from which the convalescent is free. Exception may be made to the short period assigned for the termination of infection in these diseases, but there is proof of this being near the usual limit.

Very different is the teaching conveyed by the results obtained in the investigation of the group of diseases characterised by a short period of incubation. The old *quarantine*, *i.e.*, forty days, or six weeks of isolation for those who had been infected with plague, represents very nearly the time necessary for the strictest caution to be observed after hooping-cough, diphtheria, and scarlet fever, in guarding against the spread of these diseases. The six weeks should be reckoned always from the height of the disease; and in scarlet fever, where the earliest symptoms are the most obvious, a longer interval must be allowed. Possibly, in some of these diseases, most probably in scarlet fever, infection is given off more at a certain advanced stage of convalescence than in some earlier part of it; when all the functions are more nearly restored to their healthy standard, they may expel the last products of the disease with more activity than when they were in a languid or debilitated condition. For scarlet fever, it has been shown by the first two cases in the previous paper how convalescents may communicate its infection nine weeks after the commencement of the disease; in the second case it seemed as if the infection was

more active at the end of this long period than at an earlier part of it. Another instance of this is the following:—A lad, aged 14 years, has scarlet fever in the summer in a mild form at school, where he goes through the illness with others. After a month he comes home to his family in London, but at first is kept as much apart as possible. A fortnight after his return, two sisters, aged 17 and 19 years, spend a week with him and then go on a visit to the country. They remain away ten days, and again return home to their brother; on the day week of their return they have scarlet fever; the symptoms are mild, but well marked throughout, so as to leave no doubt as to their nature. No other source of infection is discoverable beyond this return home to their brother, sixty days after the commencement of his illness. This period was exceeded in the other cases given, but in this one we remark that the infection was inoperative during a previous fortnight. May it be that some infection given off by the brother accumulated in the house, and that the sisters returned to it from the country in a higher state of susceptibility? One of our members, Dr. Elliott, of Carlisle, attests the accuracy of the following facts published by the gentleman in whose family the cases occurred.[1]

Four years ago a boy from school, convalescent from mild scarlet fever, is sent away a fortnight after his recovery, with one of his brothers as a companion; in six days this one is ill with the disease. Six weeks and a day after this, all desquamation having ceased in the younger one, and both being dressed throughout in new clothes, they return home; again in six days from their return two younger children simultaneously begin with the disease. In watching these two patients most carefully, desquamation was traceable in the mildest of the two cases up to the eighth week; at the end of the ninth week they joined the rest of the family, and no further evil consequences ensued.

More importance is generally attributed to desquamation in the spread of scarlet fever than is its due. As a visible sign concurrent with others less obvious, it is useful in showing that the reparative processes are incomplete, and in directing attention to the skin, to warmth and cleanliness; but a perfectly innocuous

[1] "On the Necessity of Perfect and Prolonged Isolation for Stamping out Contagious and Infectious Diseases." Steel Brothers, Carlisle, 1874.

cutaneous epithelium may be separating, while from another surface an actively infecting product is being set free. Perhaps the evil resulting from this erroneous view more than compensates for the good; for by directing attention exclusively to the "peeling," which, often active in the second week, may be nearly over in the third, persons are deluded into the idea that infection is then over also, and the disease again allowed to spread.

The numerous instances of infection in the latter stages of scarlet fever, and the success which usually follows early separation of the healthy from the sick in saving them from the disease, have originated an idea that scarlet fever might possibly not give off infectious particles or germs until arriving at a certain maturity; consequently, that the first stages of the disease might be harmless. A striking example of the influence of this belief occurred last November at the Epsom Petty Sessions, where a person escaped penalty for removing a scarlet fever patient in a hired fly, by obtaining direct medical testimony that the disease was not contagious in its early stages. That this is an error is clearly shown by Cases 7 and 8 in the former paper, where, of two children, one only is exposed to scarlet fever on February 17th, has rash on the 20th, and communicates it so rapidly that the other sickens with it the very next day. Another instance of scarlet fever being communicated on the first day of illness is the following:—In a family of nine children, the eldest comes home from a school in which there was scarlet fever; three days after, the mother, in delicate health, is suddenly seized in the night with illness which in the morning is recognisable as scarlet fever. The eldest of the family had already gone away; the two youngest children are now sent off with the nurse; three little girls who had been into their mother's room go to the house of an aunt near, and three of the children remain in the house; on the third day two of these are taken ill; on the fifth day, five days after the separation, one of the girls is sent home with scarlet fever; two days after, a servant and the only other child in the house are seized: the two youngest die. The five children who had been separated join the convalescents at the seaside, six weeks and three days after the seizure, without injury. Here the whole history is in-

structive: all who remain in the house take the disease; only one of the children who were removed took it, and in that case the disease appeared within six days. This corresponds with the limits laid down by Heberden and Withering; and it may be worth mention that in the only instance where symptoms have appeared as late as the eighth day after separation, there had been communication with the infected household during the interval. It is a point of the greatest practical importance that on removing the healthy from a source of scarlet fever, one week will suffice to determine their immunity. Yet children have been kept from school three weeks because they had visited at a house where scarlet fever broke out after they had left.

For diphtheria a somewhat longer separation is prudent than is required for scarlet fever. Eight days' interval is proved by Mr. Adams's case, where prompt removal was effected. Details of a similar case will be given, wherein it is not perfectly clear that the interval was only eight days. Abundant evidence of the shortness of the incubation period for diphtheria exists. We know from Sir William Jenner's case in the Children's Hospital, where the disease was found to be in an advanced stage within thirty hours, that the hours of the latent stage may be numbered by units. In the two cases selected for publication in the author's article in the "System of Medicine," we see that the shortest period could not have been less than three days in the first case, nor the longest period more than four days, in the second. But single instances do not serve to fix either the longest or shortest possible periods for diseases so variable in intensity and duration as are scarlatina and diphtheria. The following is an example of the long interval:— In the family of a Doctor of Medicine, living near the southern boundary of the Fens, a housemaid is ill with sore throat and slightly marked febrile symptoms on July 17th, 1874; on July 23rd the elder of his two children goes to visit a relative at a perfectly healthy house, well situated on the chalk, in Hertfordshire. On July 30th this child, who had been very lively and well till bed-time, becomes suddenly febrile, with vomiting, high pyrexia, and next day enlarged cervical glands; exudation soon appeared on the tonsil and fauces, and persisted for ten days; the child at home was taken ill in the same manner, on the same day: sub-

sequently two other residents in that house were ill, the one with severe, the other with slight, sore throat.

The possibility of a more than eight days' interval is suggested by these cases, but until some clear evidence of a longer interval is forthcoming, we must leave this as a limit, or allow ten days at most for it.

One reason why the duration of the incubation period for diphtheria has been unduly prolonged is because the special exudation sometimes cannot be depended on as characteristic until the third day of the disease; it often does not excite attention till a day or two later; consequently, when the source of infection is known, the interval from exposure is reckoned up to this advanced stage of the illness. A second reason is, that very often the whole time from the commencement of a continuous exposure is reckoned, though the infection may only have been received in the latter part of it. The latter consideration affects the cases contributed by Dr. Rumsey to the Second Report of the Medical Officer to H.M. Privy Council. In these, one sister takes the complaint exactly a fortnight after another was seized with it. But they had been together during the illness, the second taking part in the nursing of the first. The first sister also was seized exactly a fortnight after the return home of a brother convalescent from diphtheria, but infection might have been imparted on any day after the first of his return. In diphtheria, as in scarlet fever, infection may be more active in certain stages of convalescence than at others. This appears in some cases given by Dr. Johnson in the *Lancet*, Jan. 2, 1875.

A girl, aged 17 years, who had been ill ten days before at school, returns to a healthy country house, where are seven younger children. All keep well for a fortnight, when, the elder girl being freer from all signs of illness than on her first return, two of the children take diphtheria and die; the others, separated as soon as these were seized, all escape.

In the same article some very instructive cases observed by Dr. Carey, of Windsor, are given. In a family of nine children, two and the mother are ill with diphtheria: the mother dies; this is in December. Five of the children are then sent away; the two convalescents and two others remain at home; of these, the youngest child is seized January 15th and dies on the 23rd.

The three remaining now leave the house, which is thoroughly cleaned. The family does not return till April 9th. On April 16th a gentleman visits at the house, staying that night and the next; he feels ill on the evening of the day he left; next day he has sore throat, and on the third day diphtheritic exudation. Hence this case might by some be reckoned as of four days' duration instead of one, or of less than two days at the longest. A more important correction is required in the last of these cases. On April 23rd the whole family again leaves the house; of two children who go together to a healthy farm-house, one becomes ill on April 25th, or within the usual time for the infection of diphtheria showing itself. On May 11th the other child sickens; but instead of supposing the infection in this case to have been received eighteen days before, and taking this as a proof that it came directly from the infected house, it is easier to believe that the illness of the second child was derived from the other one then going through the disease under the same roof.

These cases require noticing at length, as they are used to support the view of local causes being in themselves sufficient to originate diphtheria. The first link in their causation cannot be traced; the persistence and fatality of the outbreak is traceable to the existence of a foul, disused cess-pit under the floor of the infected house. It is argued, from the fact of this cess-pool being disused, that infected matters from the sick did not directly enter it, and so become a source of re-infection; but it must be conceded that if the air of the cess-pool could get into the house and infect the inmates, the air of the house bearing infectious particles could get into the cess-pool; indeed, with the alternations of moisture, pressure, day and night temperature, house fires, and other causes, this interchange must be constantly going on.

The duration of personal infection in diphtheria for from four to six weeks is abundantly proved. Sir William Jenner ("Diphtheria," pp. 52, 53) gives two instances; in both it would seem that infection was particularly active in the fourth and fifth week. In a case given by the author, a little girl, who takes diphtheria after joining some members of the family at the seaside, where they had gone as convalescents, had been separated from them for six weeks.

We have lately had cases before us where exudation constantly reappeared up to six or eight weeks. A patient seen with diphtheria on the 13th of last December, probably commencing on the 10th, goes out of doors for the first time on January 24th, and again has exudation in the pharynx, exactly eight weeks from the commencement of the first attack. There is no proof in this case that infection continued throughout.

The analogy of hooping-cough points to the possibility of a relapse of certain symptoms after the infectious period is over. A boy at school, one of five children, has hooping-cough from July 16th, with the hoop on July 21st, and is kept apart till the 5th of September, when the family comes together, and no others suffer; this was after a period of seven weeks, of which the first three were febrile, and in the fourth there was much cough and expectoration: in the last three he had change of air, and was convalescent. On October 20th, after a bad cold, there is a return of cough, with hoop and expectoration; his younger brother is with him at the time, has slight cold and cough: but neither he nor others with him at school take hooping-cough.

Another group of cases of diphtheria is worth notice. A nurse returns home after a week's attendance upon a child who dies of faucial diphtheria, with much glandular enlargement. She has stiff neck and fever on the night of her return home; next day deposit in the uvula, albuminuria, temperature 104·5. Her son, a boy of seven years old, is removed to another part of the house, but a grown-up daughter remains as nurse. On the fourth day after, the boy is seized suddenly at night, and has a severe illness; the sister has sore throat on the following day with some exudation, but not a severe illness: she had previously had scarlet fever; the brother had not. The boy's pyrexia lasted ten days; twice in the course of the illness some irregular rash was observed; he had albuminuria from the second week to the sixth, with hæmaturia at the month's end. Cases approaching so nearly as this does in its course to scarlet fever, suggest a line of thought leading some to believe in the identity of diphtheria and scarlet fever, just as following another line we are brought to the close relationship of diphtheria and croup; were we, in consequence, to adopt the conclusion that those two diseases are really identical, we should be face to face with the difficulty of admitting the identity of croup and scarlet fever.

THE NEW SANITARY EPOCH.

It would really appear as if we had entered into a New Sanitary Epoch. The work of sanitary legislation begun by the late Liberal Ministry has been taken up by the present Conservative Ministry, in the session of Parliament now just opened, with a vigour and decision as unexpected as gratifying. Moreover, the manner in which this work has been entered upon betokens a very different spirit to that which actuated the Liberal Ministry in 1871 and 1872, and has no traces of that perfunctoriness which characterised the sanitary legislation of 1874. Doubtless in the last-named year the newly-formed Conservative Ministry was shackled in many respects by the work of the preceding Ministry. Now, it may be inferred, master of the position, it is prepared to deal with the subject from its own point of view. Be this as it may, the prominence given to sanitary legislation in the Queen's Speech, and in the proceedings of the House of Commons during the opening sittings of the session of Parliament which began on the 5th February, is an excellent augury of sound sanitary work. Parliament approaches the consideration of the different sanitary questions submitted to it with its attention unwearied and its patience unfried; and in the preliminary discussion of the sanitary measures which have already been brought before it, there is abundant indication of its desire to deal thoroughly and conscientiously with them.

The attitude, so to speak, of the two Houses of Parliament, in reference to sanitary legislation, as shown by the different members who have already had occasion to address the Legislature on the subject, is very noteworthy. Without exception the speakers have displayed, to our thinking, a higher conception of the objects of sanitary legislation than has been manifested in Parliament for some time back. In especial the Home Secretary, Mr. Cross, and the mover of the Address in the House of Commons, Mr. E. Stanhope, exhibited a mastery of the sanitary subjects on which they have had to touch which obviously affected the House as deeply as it has affected the

public at large. The President of the Local Government Board has, moreover, displayed qualities which make it profoundly to be regretted that he should have suffered himself to become, we fear, so hopelessly entangled in the quasi-sanitary administrative vagaries of his predecessor.

The following observations of Mr. Stanhope deserve quotation:—

"He remarked that the welfare of a nation depended largely on the physique of its population, and pointed out that during the last quarter of a century there had been a great depopulation of our agricultural districts. The country, he proceeded to say, could no longer expect to draw from that quarter any reserve of strength and energy. Our rural population was migrating into the towns, where, from the inability of the sanitary machinery to keep pace with the demands upon it, they were placed under circumstances most unfavourable to physical health and development. To cope with this evil was truly a gigantic task, because it would be necessary not only to improve the condition of the people, but also to educate them to a conviction of the importance and necessity of such an undertaking. Every step in sanitary improvement meant the expenditure of money. At every step the sanitary reformer encountered local prejudices which it took a great deal to overcome, and which could hardly be overcome at all until it came to be generally realised that sanitary improvement meant not only better health, but also possibly decreased pauperism, increased self-independence, and the shutting of some bright gleams across the sombre existence of the mass of the people. And that was not the only difficulty. Everybody believed himself capable of criticising the work. Most people looked at a sanitary measure with the narrow views which an intimate knowledge of a particular locality was apt to engender; whereas, to be applicable to the country at large, with its various conditions of life, any such measure required to have a certain amount of elasticity. Then, again, no immediate results were to be hoped for. The legislature could only look for indirect results for a time, and perhaps for a long time, even with the co-operation of the many wise, able, and energetic men who, happily, were to be found in every part of this country. Discouragement was almost generally to be expected, and delay always. Perhaps, even when some slight benefits began to appear, a hitch in the machinery which hardly anybody could have anticipated would bring the work to a standstill. Sanitary reform required patience and continuous perseverance, and perhaps long before the tree began to bear fruit those who received the credit of having planted it would have passed away."

In the Queen's Speech it was stated that Bills would be laid before Parliament for facilitating the improvement of the dwellings of the working classes in large towns; for the consolidation and the amendment of the Sanitary Laws; and for the prevention of the pollution of rivers. On the 8th February Mr. Cross brought before the House of Commons the Bill relating to the dwellings of the working classes; and on the 11th February Mr Selater-Booth the Bill relating to the Public

Health Laws. On the 11th February, also, the Chancellor of the Exchequer brought into the House of Commons a Bill for consolidating and amending the Acts relating to Loans for Public Works, a subject very closely affecting sanitary administration; and before this article appears Mr. Sclater-Booth will have brought in a Bill for the repeal of the Adulteration of Food Acts, and for making better provision for the sale of food and drugs in a pure state.

Mr. Cross's Bill for facilitating the improvement of the dwellings of the working classes in large towns substantially carries into effect the suggestions of the Charity Organisation Society on the subject, and also of a memorial, chiefly promoted by the late Dr. Anstie, which was addressed by the Royal College of Physicians to the Government last year. The details of the proposed legislation are best left for consideration until the Bill upon which Mr. Cross's statement was founded is made public. But there are several points of the statement which particularly call for notice. First, it appears that before promoting the Bill Mr. Cross visited Liverpool, Glasgow, and Edinburgh, for the purpose of studying there personally the operation of the local Acts containing somewhat similar powers to those which he now proposes to extend to large towns generally. If Ministers who are responsible for sanitary legislation are to prepare themselves, in the first instance, by acquiring a competent knowledge of the subject-matter to which the legislation relates, some hope may be entertained of avoidance in the future of that disastrous policy by which the Local Government Board has hitherto frustrated the intentions of the Legislature and made the Sanitary Acts of 1871 and 1872 the cat's-paw of a department. Is Mr. Sclater-Booth powerless to prevent the further prostitution of public-health administration as a mere branch of Poor-law administration? Next, especially remarkable was the reiterated insistence of Mr. Cross that the Bill could only rightly be promoted by the Government, and that it was so promoted solely as a matter of sanitary reform. Mark, now, a particular corollary to this as stated by Mr. Cross:—

". . . . Who are to have the duty of carrying out the Bill? Clearly not private individuals. We think we cannot do better than provide that those who are to carry out the Act should be, in the City of London, the Corporation; in

the rest of the metropolis, the Metropolitan Board of Works; and in other large towns, the Town Councils, which are practically the sanitary authorities. Who, then, shall put the Act in motion? *We proceed entirely on sanitary grounds. We don't wish them to make street improvements for their own aggrandisation. It is only sanitary purposes we have in view—therefore we think the Act should be put in motion by the medical officer*, who, by his own view, or called upon by a certain number of ratepayers, would be bound to report and certify whether in his opinion the place was an unhealthy district, whether disease prevailed there, and whether that was attributable to the badness of the houses."

Contrast this view of the position of the medical man in sanitary work with that enunciated by Mr. Stansfeld (see *Practitioner*, February 1875), and by him made a special feature of the sanitary administration of the Local Government Board. Because the subject-matter of his Bill is a sanitary matter, and to be treated only as such, Mr. Cross holds that a medical man is the proper interpreter of the necessity for its application, and being so, the medical officer of a locality should be enabled of his own motion to take action under the Bill. On the other hand, Mr. Stansfeld holds that there is no necessary connection between medical functions and sanitary work, and that the position of the medical man in relation to sanitary administration should be no other than that of the apothecary in general practice; namely, his duties only begin when his patients think they need him. So of the medical man in sanitary administration, "it was necessary to reserve him for occasions when there was a sense that his special knowledge and services were needed." Mr. Cross, *because* the subject-matter of his Bill is sanitary, holds that an initiatory action of the medical officer is necessary to give force to it. Mr. Stansfeld (and following him Mr. Sclater-Booth, according to Mr. Stansfeld holds that such initiatory action on the part of the medical officer "would be a disastrous and fatal mistake," and would betray a want of respect and trust towards local administrations. We know what the results of Mr. Stansfeld's policy have been in rendering futile sanitary administration over a large portion of the kingdom, and in provoking needless opposition to the working of the Sanitary Acts. Mr. Cross's observations lead to some hope that he represents a better conception of sanitary administration, and that Mr. Sclater-Booth will be extricated from the anomalous departmental position in which he is placed, if Mr.

Cross's principle of sanitary administration be accepted by the Legislature.

Mr. Sclater-Booth proposes in the Bill which he submitted to the House of Commons on the 11th February, not only to consolidate the various Sanitary Acts (twenty-nine having been passed since 1846), but to amend them in several important particulars. His propositions were made in a very able statement, but we defer our observations upon them until the Bill is made public.

UNSUSPECTED SOURCES OF MISCHIEF FROM SEWER-AIR.

Dr. A. Fergus, of Glasgow, has directed attention[1] to two unsuspected sources from which sewer-air is apt, he holds, to become mischievous, and which need to be constantly present to the minds of practitioners. The one of these sources is corrosion and perforation of leaden traps and soil-pipes; the other source is diffusion of sewer-air through the water of the traps.

The corrosion and perforation of leaden soil-pipes and traps is not a new fact, but we believe that the discovery is owing to Dr. Fergus, of a more or less frequent connection of such perforation with the prevalence of enteric fever and other diseases observed in connection with pollution of the atmosphere from sewer-air under conditions where such pollution was believed to be out of the question. Fifteen years ago, Dr. Fergus's attention was first directed to the probability of perforated traps and soil-pipes being an unsuspected source of mischief in families. Giving attention to the subject, he caused examination to be made of the state of the water-closet traps and the soil-pipes in houses where enteric fever, or diarrhœa, or other disease occurred liable to be determined or aggravated by sewer-air. Again and again he found, under conditions of presumed excellency of drainage arrangements, the soil-pipes open, by means of numerous perforations in the trap or in the upper part of the soil-pipe, to the atmosphere of the house. He has made a collection of such defective traps and pipes (drawings of examples being given in

[1] "The Sewage Question: with Special Reference to Traps and Pipes." Glasgow: Porteous, Brothers, 1874.

the pamphlet referred to), and they form peculiarly instructive illustrations of the hidden dangers of a drainage system which is not systematically overhauled.

The particular danger of perforated leaden traps and soil-pipes is probably more commonly present than might at first be supposed. Leaden traps and soil-pipes are still largely used in house drainage, and they are ordinarily met with in the drainage arrangements of old mansions. A few days ago we had an opportunity of seeing part of a soil-pipe and trap from an old mansion in the west of London, quite riddled with corrosion, and which must have existed long in that state, wholly unsuspected.

We quote Dr. Fergus's observations on the locality of the perforations in soil-pipes, and the length of time a good soil-pipe may remain in use without serious deterioration :—

"In the first pipes I inspected, as the perforations were on the upper side, I imagined that pieces of lime might have dropped down on the pipes and eaten their way through. This opinion I abandoned, as I found the perforations were from within. I also found that they were generally on the upper surface of the pipe, and that therefore the destruction could not be caused by fluid conveyed through it. I also observed that the pipe usually affected in this manner was the cross one, leading from the closet to the main descending soil-pipe; and that if there was a bend or arch in the pipe, the upper surface of the bend or arch would become perforated. Another element to be taken into consideration is, that these perforations are most frequently found in the upper flats of houses, and, occasionally, in the sides of the descending soil-pipes.

"The question now arises, How is this destruction of good well-made lead pipes effected?

"If we remember the position of this destructive action in the pipes, and take into consideration the results of chemical analysis,[1] as well as the increased rapidity with which this action takes place in pipes that are not ventilated, I think we are justified in coming to the conclusion that these results are owing to the action of sewer-gas. . . . Lead has generally been used as the material for

[1] "By Mr. Stanford's kind permission, I am enabled to give the analysis of the inner coating of these pipes :—

Carbonate of lead . . .	2·70	86·00	91·00	92·90
Carbonate of lime . . .	80·63	2·50	2·10	2·90
Water	0·45	1·20	1·00	0·50
Lead insoluble as oxide . .	—	3·50	1·50	1·45
Silica	1·35	2·80	1·00	1·60
Organic matter	14·87	4·00	3·40	0·65
	100·0	100·00	100·00	100·00

The analysis No. 1 indicates that probably chloride of lime had recently been used to destroy the effluvia from the already perforated pipes."

soil-pipes, and as we have seen how capable it is of corrosion, it becomes a very important sanitary question to inquire how long a good lead soil-pipe will hold out. I have been studying this question for years, and it is now about seven years since I first exhibited decayed pipes in public, yet, I would not wish to dogmatise on the subject, but rather give approximations, and would remark that the time will vary under the various circumstances according to the strength and rapidity of the flow of the sewage, as well as the original thickness of the pipe But after allowing for this, we must broadly distinguish between soil-pipes which are ventilated and those which are not. By the former I mean when the pipe is carried up to the roof of the house and open to the external air; by the latter, I mean when the pipes are closed up. Of these last-mentioned, the duration may be stated to be about 12 years, the extremes of variation being from a minimum of 8 to a maximum of 20 years. In ventilated pipes the duration may be stated to be nearly double, running from 21 to 33 years, the extremes of variation being from 18 to 30 or even more years. The practical sanitary conclusion which it concerns us all to keep in mind is, that any house, no matter how carefully or well built, may become unhealthy from this source, and that when cases of typhoid fever, diphtheria, &c. occur, the pipes should be thoroughly inspected, especially under their upper surface, and the whole of the soil-pipe uncovered. I must strongly insist on this, as in many cases the plumbers have declared pipes to be all right which turned out to be very defective when uncovered. For some years back I have insisted on a careful examination of the soil-pipes wherever I have cases of typhoid or diphtheria, and in every case where I could get this carefully carried out, I have detected these perforated pipes, or sewer-air getting into the houses in some other way." (p. 21.)

With regard to the diffusion of sewer-air through the water of traps, Dr. Fergus has made certain experiments, and he quotes others made by Mr. MacTear, which lead him to suspect that sewer-air is much more rapidly diffused through the water of traps than is usually believed. Mr. MacTear's experiments were made with ordinary three- or four-inch leaden traps. He used various gases, and also putrid matters, to test the passage of odours. It was observed in these experiments that the light gases passed, in the first instance, from one side of the trap to the other, along the upper stratum of liquid, while the heavy gases sank to the bottom and traversed the lower stratum. The experiments were conducted with ventilated traps, and the second and third series may be quoted in illustration of the results:—

II.—4-inch large lead trap, ventilating tube 1 inch dia., 2 feet long.
1st. NH_3 passed through 3 inches of water in 3′ 20″.
2d. Coal-gas ,, ,, ,, 4′ 35″.
3rd. Putrid egg and urine; smell passed through in 3 days.

III.—Small lead trap 3 inch dia.; ventilating tube 1 inch dia., 2 feet long.
1st. NH_3 passed through in 2′ 55″; 2 inches water in trap.
2d. Coal-gas ,, 1′ 25″ ,, ,,
3rd. Putrid beef-juice; smell through in 3 days.

The large trap contained of water 228 cubic inches, or 132 oz., and the small trap 45 cubic inches, or 27 oz. The gases were not given up under pressure.

The question here raised by Dr. Fergus deserves attentive consideration and further study. The great practical importance of his observations of the corrosion and perforation of traps and soil-pipes must be obvious.

DR. BUCHANAN ON CRUDE DEATH-RATES.

[THE following paper, which has recently been distributed to members of the Society of Medical Officers of Health, and which is from the pen of Dr. Buchanan, one of the assistant medical officers of the Local Government Board, is one of the most interesting and instructive contributions which have been made to the discussion raised by Dr. Letheby on death-rates. Dr. Buchanan compares the death-rates of two districts of the kingdom (Lancashire and the South-Eastern Counties Registration Division), having a certain similarity in gross numbers and population, but differing widely in social and occupational conditions. From this comparison, stated numerically without comment, he leaves the reader to form his own inferences as to the value of Dr. Letheby's wholesale condemnation of crude death-rates in estimating the sanitary condition of communities and the comparative salubrity of towns. It will be observed that, for the years considered, the excessive mortality of Lancashire, as compared with the South-Eastern Counties, extends to all periods of life, and that if the mortality of this county had been at the same rate as the South-Eastern Counties, it would have lost 49,289 lives only instead of 78,752, the actual number lost; while, on the other hand, if the mortality of the South-Eastern Counties had been at the rate of Lancashire, they would have lost 63,673 lives instead of 40,822. These large differences in the death-rates of the two districts concur, as is well known, with correspondingly large differences in the salubrity of the districts, and it will hardly be contended that this concurrence is merely a coincidence.]

SOCIETY OF MEDICAL OFFICERS OF HEALTH: SESS. 1874-5.

A member of the Society, studying for his own purposes the questions raised in the President's opening address of the present session, has examined the statistics of two portions of England as to the comparative mortality in them at various ages, and arrives at the following figures, which furnish, he thinks, handy material for the consideration of some of these questions. The two portions of England chosen for comparison are large enough for the results to have some significance; they differ much in their social and occupational conditions; they have a certain resemblance in gross numbers of population; they are both subject to much immigration, not, however, of the same character; their birth-rates differ as 38 to 32; and their death-rates as 27 and 19. The census year was, in regard of both births and deaths, an average in both of those portions of England, and the census year has been taken for more particular examination.

G. B.

TABLE I.

	Lancashire.	South-Eastern Registration Division.
Census population, 1861	2,465,366	1,847,512
Census population, 1871	2,849,259	2,167,726
Annual increase per thousand of Population in the Ten Years 1861–71. This is somewhat greater than the "annual rate of growth."		
Total annual increase	$15\frac{2}{3}$	$17\frac{1}{3}$
Annual increase by excess of registered Births over registered Deaths	$11\frac{2}{3}$	14
Annual increase in other ways, essentially by excess of immigration over emigration ...	4	$3\frac{1}{3}$
Rates per thousand of the Mean Population, 1861–71.		
Mean annual Births in ten years, 1861–70 ...	38	32
Mean annual Deaths in ten years, 1861–70 ...	27	19
Rates per thousand of the Enumerated Population, 1871.		
Births in year 1871	38	32
Deaths in year 1871	$27\frac{2}{3}$	19
Growth, in year 1871, by excess of registered Births over registered Deaths	$11\frac{1}{3}$	13

TABLE II.

Age-periods	Lancashire. Census Population 1871, at the several Age-periods	Lancashire. Population at each Age per cent. of Population at all Ages.	Lancashire. Number of Deaths in 1871 in the several Age-periods	South-Eastern Registration Division. Census Population, 1871, at the several Age-periods.	South-Eastern Registration Division. Population at each Age per cent. of Population at all Ages.	South-Eastern Registration Division. Number of Deaths in 1871 in the several Age-periods	Lancashire. Death-rates per 1,000 living at each Age-period.	Lancashire, S. E. Division. Death-rates per 1,000 living at each Age-period.	Lancashire Death-rates at the several Age-periods are ——— of the corresponding South-Eastern rates to the subjoined degree per cent.	Age-periods
Col. 1	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
0—1	90,431	3·15	20,687	62,038	2.85	8,572	228·7	138·2	65	0—1
1—5	301,856	10·6	15,567	224,082	10·3	5,055	51·5	22·6	125	1—5
5—15	632,672	22·2	4,847	488,130	22·6	2,518	7·7	5·1	50	10—15
15—25	548,099	19·2	4,731	393,226	18·2	2,417	8·7	6·1	46	15—25
25—35	455,996	16·0	5,624	318,829	14·7	2,943	12·3	9·2	34	25—35
35—45	336,917	11·8	5,678	244,625	11·3	2,896	16·7	11·8	41	35—45
45—55	245,044	8·6	5,912	189,780	8·8	2,917	24·0	15·3	57	45—55
55—65	147,380	5·2	6,284	132,872	6·1	3,645	42·0	27·4	53	55—65
65—75	69,846	2·5	5,683	79,732	3·6	4,591	81·4	57·6	41	65—75
75...	21,018	·74	3,739	34,412	1·55	5,268	177·9	153·1	15	75...
All Ages	2,849,259	100·00	78,752	2,167,726	100·0	40,822	27·64	18·83	47	All Ages.

The rates of mortality prevailing in 1871 in the South-eastern Registration Division at the several age-periods (Table II., col. 9) have next been applied to the Lancashire census populations at those age-periods (Table II. col. 2); and, conversely, the rates of mortality prevailing in 1871 in Lancashire at the several age-periods (Table II., col. 8) have been applied to the South-eastern census populations at the several age-periods (Table II., col. 5), and the annexed Table shows the numbers of deaths that would have occurred in each of the two portions of England, if the death-rates of the other portion had in 1871 prevailed in it.

TABLE III.

Age-periods.	Lancashire, 1871.		South-eastern Division, 1871.	
	On own proper Death-rates the Number of Deaths was	On South-eastern Counties Death-rates the Number of Deaths would be	On own proper Death-rates the Number of Deaths was	On Lancashire Death-rates the Number of Deaths would be
0—1	20,687	12,496	8,572	14,188
1—5	15,567	7,025	5,055	11,536
5—15	4,847	3,227	2,518	3,759
15—25	4,731	3,344	2,417	3,421
25—35	5,624	4,195	2,943	3,921
35—45	5,678	3,976	2,896	4,085
45—55	5,912	3,748	2,917	4,555
55—65	6,284	4,038	3,645	5,581
65—75	5,683	4,022	4,591	6,505
75	3,739	3,218	5,268	6,122

Adding up the columns for Lancashire, as thus obtained, there results the number 49,289, which gives a death-rate of 17·30 per thousand on the census population of Lancashire; a death-rate less by 10·34 per thousand than the actual death-rate at all ages of Lancashire in the year 1871. And, adding up the column for the South-eastern Division, there results the number 63,673, which gives a death-rate of 29·37 per thousand on the census population of that Division; a death-rate greater by 10·54 per thousand than the actual death-rate at all ages of the Division in 1871.

THE PRACTITIONER.

APRIL, 1875.

Original Communications.

THE THERAPEUTIC VALUE OF THE BALSAM COPAIBE.

BY A. R. HALL,

Surgeon, Army Medical Department.

THE attention of the profession having been drawn to the use of copaiba as a diuretic, by Dr. Dixon, in the February number of the *Practitioner*, I think it may be of interest if I record the benefits I have seen to result from the use of this drug in a variety of diseases. As we all know, it is given almost exclusively in gonorrhœa; so much so, that persons for whom it is prescribed are usually suspected of suffering from that disease. But I consider it to be such a valuable remedy in many cases, that I wish to contribute my share of testimony in its favour.

One of the most satisfactory instances of the effect of any medicine that I ever met with was in a soldier of the Buffs, suffering from iritis, in India. In June 1872 I was asked by Surgeon-Major Collis, of that regiment, and Staff Assistant-Surgeon Tothill, to see a patient in their hospital. I found the right eye highly inflamed, and the whole of the anterior chamber *filled with pus*. Of course, vision was entirely lost. The patient

had suffered from repeated attacks of syphilis, and he had been treated with calomel and opium, counter-irritants, and a variety of alteratives, but with no good result. I certainly thought that the eye was gone beyond redemption; but I said that I had seen such good results following the exhibition of the balsam in iritis, that it might be tried as a last resort. Two drachms were therefore ordered, in mucilage, three times a day. Two days after, the pain he had been suffering from subsided: daily, the pus could be seen to be gradually disappearing. At the end of ten days he could see the length of the ward, and after twenty days the eye was quite well. A short account of the case was published by Mr. Tothill in the *Indian Medical Gazette* for September 1872. As he writes, the balsam had acted "like a charm," and all who saw the man were convinced that, but for it, the eye would have been destroyed. I had repeatedly given it in cases of iritis, and almost always with benefit, but I never expected that it would act so well in this case.

I have been in the habit of giving it in all cases of iritis and sclerotitis for some years in India, and found it far preferable to turpentine, as it does not produce strangury, which the latter drug is very apt to do in that hot climate. The horrible pain of sclerotitis, the eye being described as feeling "like a red-hot ball," I have found often to subside after four or five large doses of the balsam, and the inflammation disappear. At Seetapore, in Oudh, during the year 1872, I had at one time more than thirty children, suffering from purulent ophthalmia, under my care. I treated them all by simply painting the lower eyelids, upper part of the cheeks, and temples, with the pure balsam copaibæ, and they all got well quickly without any damage to the eyes. Mr. C. Macnamara, the ophthalmic surgeon to the Calcutta University Hospital, in his work on Eye Diseases, recommends the balsam in iritis; but I do not think that the advantages that apparently follow its use in almost all cases of inflammation of the eye are generally recognised.

In threatened mammary abscess, I think it may be often employed with manifest benefit. Some years ago, in India, I attended a delicate lady in one of her confinements, who had

formerly suffered from an abscess of one breast. Before it formed, leeches had been applied, and an antiphlogistic regimen ordered. Some time after the confinement the other breast began to inflame; and she told me that, judging from her former sensations, she felt convinced that an abscess would form, which made her dreadfully low-spirited, as she had nearly died from the effects of the former one. The breast was hard, hot, and painful, and she had to give up nursing her infant. I made her take as much milk, beef-tea, and solid food as she could, with porter and port-wine; and every morning and evening, for a week, painted the whole surface of the breast with the pure balsam, covering it with flannel and oiled silk. Whether the copaiba prevented the formation of the abscess I won't affirm; but no suppuration occurred. As a rule, it is in the weak and anæmic that these abscesses form, and probably the nourishing diet did her most good. But I have employed the balsam in other inflammations, locally, with advantage. I remember reading some years ago a paper by the late Mr. Skey (I think in the *Lancet*), deprecating lowering remedies and diet in mammary abscess; and it seems to me that the same advice may be followed in other abscesses. In most cases of inflammation of mucous membranes, acute as well as chronic, the balsam seems to give relief. The rapidity with which a few doses check the *ardor urinæ* in gonorrhœa is well known. I think it was the late Dr. Blackhall, of Exeter, who, many years ago, first recommended it in bronchitis. My friend Mr. Body, of Crediton, fifteen years since mentioned to me that he always gave it, in 20-minim doses, to patients, chiefly farm labourers, who frequently in Devonshire suffer from dysentery during the autumn, and that they generally get well after a few draughts. In cases of chronic cystitis, where the urine has contained quantities of mucus, I have seen great benefit following its administration.

Chronic rheumatism, both of the muscles and joints, particularly in old people, who confess that they feel much better after a glass (or two) of hot gin and water when going to bed, frequently disappears after a few drachm doses of the balsam, combined with some astringent to prevent purging. I have heard several say that it "seems to warm the joints;" in what-

ever way it acts, it is worth trying in cases where other remedies have failed.

It has been found useful in some skin diseases. I read some time ago of a patient who was admitted into the hospital with gonorrhœa, who had psoriasis. It was determined to attack the gonorrhœa first; so balsam was given internally. To the delight of the patient and the surprise of the medical attendant, the psoriasis disappeared as well as the local affection. I have found the pure balsam a very useful application in old indolent ulcers of the legs.

I have here, in a rough way, just jotted down some of my own experiences in the use of balsam copaibæ, and I hope they may induce some medical men to try its effect, particularly in eye inflammations. Now that it can be so easily given in capsules, its nauseous taste is not such a great objection as it used to be. The Pharmacopœia does not contain many balsams, and copaiba is the one usually employed internally, but I fancy others less disagreeable might be given.

The question, *how does it act?* may give rise to various differences of opinion. The treatment of inflammations has of late years undergone great changes, and stimulants are now given when formerly they would have been thought pernicious. Dr. Beale, in a paper published nearly three years ago in the *Medical Times and Gazette*, on the action of alcohol in inflammations, states that where there is a tendency to suppuration, the indication is to prevent the formation of the *points of stagnation*. I fancy that the balsams have a slower, but more prolonged, action over the capillaries than alcoholic stimulants have; and that partly by their effects on the nervous system, and partly by their actual presence in the blood-vessels, they stir up the capillary circulation where congestion has commenced, and so these *points of stagnation* (the real centres of suppuration) cannot form. I am aware of the influence that the observations of Cohnheim and others have had latterly on the important subject of inflammation, and it is not my intention here to enter into that subject. I prefer to lay a few apparent facts before the readers of the *Practitioner*, the perusal of which I trust they will find of some benefit, and to leave them to form what theories they like upon the matter.

ON PUERPERAL ECLAMPSIA.

(Notes of a Clinical Lecture.)

BY DR. MATTHEWS DUNCAN, F.R.S. ED.

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It is to-day my object to give you a sketch of a very interesting affection, of which an example has recently been admitted into Ward XVI.

Puerperal eclampsia is an unmistakable disease which is still very far from being understood, but on which much light has recently been thrown. It used to be confounded with apoplexy because the patients were often suddenly attacked, and because they became rapidly more or less comatose; and the error was confirmed by the occasional discovery *post mortem* of clotted blood within the cranium, generally between the meninges. But the symptoms alone distinguish it from apoplexy, especially the recurring attacks of epileptiform convulsions which have given it one of its common names—"puerperal convulsions." Then it was confounded with epilepsy. But the distinction from this was soon made, eclampsia being an acute, while epilepsy is generally a chronic disease; the resemblance to epilepsy being indeed confined to the circumstances of the individual convulsive attack.

Puerperal eclampsia has more likeness to infantile convulsions than to any other disease; excepting, of course, the almost identical disease which may occur in uræmic men and women, apart from pregnancy or childbearing. A child, scarcely able to walk, gets into a garden and eats some pretty raw fruit. Shortly, it is seized with a series of epileptiform attacks, with intervals of stupor or coma; and these attacks continue till the offending fruit is vomited. Then the fits cease, and the child

rapidly recovers. The analogy between this and the most ordinary form of puerperal eclampsia, though not perfect, is very close. A woman, believed to be in good health, like the patient upstairs, is unexpectedly taken with epileptiform convulsions. She is known to be in a state of advanced pregnancy. The fits continue, and between them she is comatose. At last, after more than twelve hours of this acute disease, the fœtus is expelled, and the fits cease. The woman rapidly recovers.

The predispositions to this disease are not well known. Among them are primiparity and hard labour, and the influence of these conditions is easily explained, as will be presently seen. But when Lever observed that the urine of these eclamptic cases was often albuminous, everyone at once recognised the discovery of a great fact, and the further history of the investigation of the disease confirms its significance. The uræmic theory was the consequence. It was soon ascertained that Bright's disease in a chronic form, in pregnant women, predisposed to eclampsia; and it was generally, but wrongly, said to cause it. Then it was also observed that acute renal attacks, which were far more common, had the same influence. Much error has arisen from confounding with these cases, others in which there was no Bright's disease; where there was only a trace of albumen, such as is found in the urine after a seizure of epilepsy as well as an attack of puerperal eclampsia. The frequent discovery of traces of albumen in the urine of pregnant women, whether eclamptic or not, and the mixture of these cases of slight albuminuria with cases of more copious albuminuria attending some form of Bright's disease, had produced statistics which were most misleading in connection with this subject. A similar error would be to confound cases of diabetes mellitus in pregnancy with the slight glycosuria alleged by some to be invariably present in that condition.

In Bright's disease the blood becomes loaded with urea. This happens in men, of course, as well as in pregnant women. Eclampsia does not invariably occur in either class of cases, but it is very much more frequent in the latter than in the former; and here there is an evident insufficiency of the uræmic theory, if held to be the whole account of the cause of the disease as well as of a predisposition to it. Why should it be so frequent in uræmic pregnant women?

Frerichs now advanced his hypothesis, that the cause of the eclamptic attacks in the uræmic was the transformation of urea into carbonate of ammonia. That there is plenty of carbonate of ammonia in the blood, in the expired air, in the vomit, and in the fœtal blood of eclamptic puerperal women, is at least generally believed; and it can be sometimes demonstrated in the breath by means of a rod dipped in muriatic acid. I have not time to enter upon this hypothesis, and shall merely say that, in spite of the numerous attacks on it by Oppler and others, it has recently received some support from the experiments of Spiegelberg and Gscheidlen. The hypothesis of Frerichs is an appendage of the uræmic theory. The theory of Traube and Rosenstein is generally regarded as antagonistic to the uræmic theory, but it appears possible to combine them and produce a view of the disease which may perhaps be even sufficient as a guide to the proper treatment. These gentlemen invoke the well-known watery condition of the blood of healthy advanced pregnancy, which Andral pointed out, and increased cerebral blood-pressure from hypertrophy of the left ventricle which was demonstrated by Larcher. These combined conditions produce congestion, then œdema, and ultimately anæmia of the brain, and thus the disease is supposed to be accounted for.

But there are many other circumstances, either actually known or nearly ascertained, which cannot be neglected when we frame a theory of this important practical subject; and a good theory is most valuable, for, in spite of ourselves, our theories govern our treatment.

Now, healthy women in advanced pregnancy are known to be hydræmic. The researches of Gassner show that a woman in pregnancy gains considerably in weight, excluding the weight of the gravid uterus. Recent investigations by Spiegelberg and Gscheidlen indicate that there is a plethora of the watery blood. Some unpublished researches of Dr. Hardie indicate an increase of the quantity of urea in the blood. The presence of increased urea in the blood causes, as Mahomed has recently described, contraction of the small arteries and increased blood-pressure, and these demand increased power of the heart's action. These latter conditions are all materially increased by an attack of Bright's disease to which women in pregnancy are peculiarly liable. On a pregnant woman in this

healthy condition, strikingly like as it is to that produced by Bright's disease, come the throes of labour which interfere with the regularity of respiration and suddenly increase the cerebral blood-pressure, flushing the face. It does not seem wonderful that under this combination of circumstances fits should occur, and that they should often appear to recur simultaneously with the pains. If the uræmic theory is insufficient, so also is the theory of Traube; but the bases of both theories may be advantageously combined with increasing knowledge as to the conditions of healthy pregnant women, with a view to a more thorough explanation of the production of the fits.

[*Here were stated the facts of the case.*]

You have here a picture of a case of a truly awful disease. Bystanders are greatly terrified by the fits as they recur and convulse the patient. But the mere phenomena of these paroxysms do not in the same manner alarm the intelligent practitioner, for he is aware that the patient may undergo almost any number of these without irretrievable damage. He has, however, in addition, knowledge of terrible events that may happen: the patient may suddenly die in a fit, and when this happens it is not rarely in the first fit; the patient may become gradually more cyanotic and comatose, and die exhausted, as it is frequently called; and although she may appear to recover, she is more than ordinarily liable to die from secondary diseases during puerperality.

When you have seen one case of this disease, you can have only a very imperfect notion of it. Cases differ from one another very much. You may have a case without eclampsia or allied symptoms; you may have a case where nightmare terrors and pains in the head take the place of the convulsive paroxysms; you may have a case with coma alone, with a single fit, or with only two or three; you may have a case with very numerous fits, but without any evident symptoms of great danger; and the most common cases are much more formidable and manifestly very dangerous.

Here is a disease which offers the physician an opportunity for a triumph; but, alas, we have no sure remedy. The physician can do very much, and probably saves many lives; and he will be most successful who does not blindly trust to any proceeding or drug, but uses cautiously his resources, watching their effects.

It is a good custom to have the alimentary tract evacuated. The urine, sometimes very scanty, is drawn off and preserved for examination. Gentle diuretics are administered, if the patient can swallow. Care must be taken lest the patient injure herself, and you will try to prevent her biting her tongue. Artificial respiration may be required towards the end of a fit.

The most valuable resource is, for evident reasons, the evacuation of the uterus; but this is a remedy which taxes all your wisdom to use properly. It may be a desperate resource, or it may be an easy operation, easily judged appropriate and easily done. Its desirableness is based on the circumstance that in very many cases the fits stop when the uterus is evacuated; but this desirableness has in many cases, when the labour is little advanced, or apparently not yet begun, to be measured against the danger of the operation to both mother and child. In the second stage of a labour advancing too slowly, you would not hesitate to apply the forceps; on the other hand, if labour were not apparently present, you would justly hesitate, proceeding to perform forced labour only in circumstances truly desperate. Here comes an important practical question, When is a case desperate? To enable you to answer this question, you will find it advantageous to call to your side your best and most experienced friend, to aid you with his counsel. In the worst cases the nature of the fits varies, being often frequent and severe; but, especially, the patient's condition is gradually becoming aggravated; she becomes paler, more cyanotic, her breathing shallower, her pulse feebler, and her coma profound.

We now come to remedies which are the subject of much difference of opinion. These are venesection and narcotics. In my young days, I was taught, on the authority of Hamilton, that bleeding was the "summum remedium." Then chloroform was discovered, and immediately, without good reason shown, bleeding was decried as injurious, and chloroform declared to be the "summum remedium." We may take what lesson we can from observing the effects of these sudden changes of opinion, and we must try to be less fickle and more rational.

Bleeding is useful in two ways. In the most desperate circumstances a small amount of blood drawn by venesection relieves the distended right ventricle. But it is as a good large depletion of from twelve to twenty ounces that this resource

is generally esteemed. It is most relied on in cases where there is the appearance of plethora and great vascular tension, and I do not doubt that it is sometimes very useful. Occasionally the practitioner is flattered by the immediate appearance of signal, though perhaps only temporary, benefit; the patient, who has been in deep stupor for hours, looking up intelligently before the blood has ceased to run; and this happened in our present example. I am sorry I cannot give you precise instructions for the application of this potent remedy; and I need scarcely remind you that while it meets some of the morbid indications, diminishing blood-pressure and removing blood poisoned with urea, it injuriously favours the hydræmic condition; and although it diminishes blood-pressure at the time, it may be doubted whether it does so permanently, or even for an hour.

We now come to narcotics, and among these, that chiefly relied on is chloroform, recommended originally by Simpson. Opium or some of its preparations is extensively used, especially on the Continent, but it is chloroform that has made the reputation of this class of remedies. Latterly, chloral has been frequently resorted to with apparently good results. No satisfactory theory of the utility of these remedies has as yet been discovered. By a few, certainly not by Simpson and most other physicians, they have been supposed to produce their effect by restraining effort and thus obviating the concurrent increase of cerebral blood-pressure which is supposed to be the cause of the fits. Admitting the almost proverbial difficulty of estimating the value of a remedy, I conclude by some dogmatic statements as to the use of chloroform in this disease. Often it appears to lessen the frequency and severity of the fits, and to be otherwise satisfactory in its results. Occasionally it is impossible to attribute to its use any good effect whatsoever, the case going on as before its exhibition was commenced; and this, whether given in large or in moderate doses. Occasionally it seems to have an injurious effect; the case, under its use, becoming more and more desperate. I use it only experimentally and cautiously, in those cases where the respiration is imperfect, there being much cyanosis; and it is not unnatural to suppose that the intoxicated blood of such a patient will be rendered more baneful by the addition to its constituents which will be derived from the inhalation of chloroform.

ON THE EXAMINATION OF PATIENTS SUFFERING FROM EYE-DISEASE.

(Being an extract from a forthcoming volume of "Essays on the Diseases of the Eye.")

BY R. BRUDENELL CARTER, F.R.C.S.

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(*Continued from p.* 121.)

THE principle of Professor Förster's instrument is perfectly sound, but its details are extremely faulty. It is very large, heavy, cumbrous, and costly; its strings are constantly becoming loose, or twisted, or otherwise out of gear; its chin-rest is too low, the instrument being on a table, for the comfort of the great majority of patients; its fixing point is too near the eye to be steadily looked at, by persons who are past middle age, without much fatigue of the accommodation; and the superfluous half of its semicircular band is perpetually in the way. After enduring these inconveniences for a certain time, I made an attempt to overcome them, and with the help of Mr. Hawksley produced the perimeter now to be described. Since its appearance I have been made acquainted with some other English and Continental contrivances for the same purpose; but, possibly from parental partiality, my own instrument still appears to me to be the best, as it is certainly the cheapest and the most handy, which has yet been constructed.

It consists, as shown in Fig. 7, of a simple tripod, supporting a hollow stem, A, in which a second stem, B, moves up and

down, and can be fixed at any desired height by the screw C. At the top of the stem B, there is a short horizontal axis, D, carrying the quadrant E E′, which turns with great freedom in a complete circle, and can be secured at any point by one turn of a screw which projects from the axis D. On the quadrant is a travelling slide, F, with a white spot; and a second independent axis is inserted in the axis of the quadrant at G, and carries a short tube, in which may be placed a stem to support the fixing point. The second, or inner axis, makes a complete revolution within the first, without affecting the position of the quadrant,

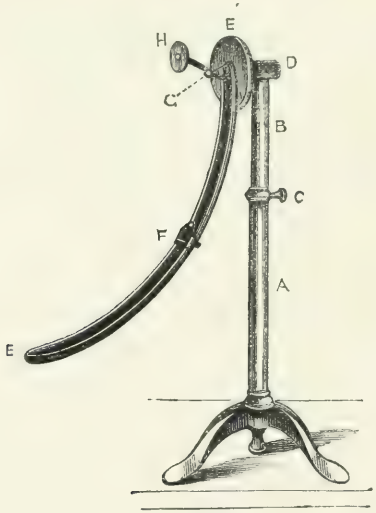


Fig. 7.

and without being affected by it. At its attached extremity the quadrant terminates in a circular disc, E′, which is graduated into degrees at the back, where a fixed index allows the exact position of the quadrant to be read off. The quadrant is also graduated from ten degrees to ninety on its concave face, so as to show the exact position of the slide. The fixing point may be either an ivory knob at the end of a wire, or, what is for most purposes better, a small disc with a central perforation, as shown at H, through which the patient looks at an object on the other side of the room, and obtains fixation without strain of the

accommodation and consequent fatigue to the eye. The travelling slide, F, may be made to carry a spot of any colour or size that is desired; and a small box under the centre of the tripod contains a selection for this purpose, together with an ivory knob which may sometimes replace the disc H. The slide is also furnished with a ring at the back, by which it may be moved by means of a hook set in a long handle, so that its position may not be pointed out to the patient by that of the hand of the operator. For the purpose of taking exact measurements of the blind spot, the quadrant is graduated at the back, from eight degrees to twenty-five, in degrees and sixths of a degree; and a white dot is placed on the centre of the axis at G, to serve as a fixing point for this particular purpose.

In order to use the instrument, the patient is comfortably seated in front of a table, with the plane of his face vertical, and with his chin supported by the rest of a demonstrating ophthalmoscope. The perimeter is then set at such a height as to bring the centre of its axis to the level of his eyes, and is placed with this centre exactly opposite the eye to be examined (*i.e.*, an inch and a quarter to the right or left of the median line, according to the eye), and exactly twelve inches distant from it. The patient closes the eye not under examination, and covers it with the hand, resting his elbow upon the table for the sake of insuring steadiness.

In order to measure the blind spot, the smallest white object is fixed to the slide, and the quadrant is raised until it is nearly horizontal, on the temporal side of the eye under examination. The patient is directed to fix the central point G, and the slide is moved from outwards towards the centre, until its white spot disappears from the patient's view, which it usually does at about 17°. Continuing the same movement, it reappears, say at about 14°; thus giving three degrees as the horizontal width of the blind spot in that meridian. Placing the white spot half way between the two points, at 15½°, the vertical measurement may be taken by raising and lowering the quadrant until the white spot reappears in each direction, usually at the meridians of 90° and 58°. The horizontal and vertical measurements may thus be taken in as many meridians as we desire; and an exact outline of the visual hiatus which corresponds to the blind

spot may be traced upon a chart. Fig. 8 shows the kind of chart which is required for this purpose, and the irregular line represents the gap in the field which is produced by the blind spot of my own right eye.

In order to measure the entire field, the perforated disc must be used for fixation, and must be so set that, when the patient looks through the hole at a distant point, the centre of the axis may correspond with the centre of the blind spot. For this purpose, in a normal eye, the centre of the opening in the disc should be 10° above the horizontal meridian, and $17\frac{1}{2}$° from the axis, on

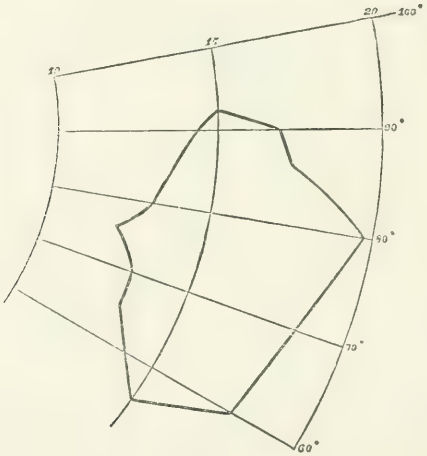


Fig. 8.

the nasal side of the eye under examination. The patient is then instructed to look through the hole, the instrument being arranged as before, and the eye not under examination being closed. The operator places the quadrant successively in as many meridians as he thinks fit, and moves the slide from without inwards in each of them until he has completed the circle, marking the limits of perception and of clear vision on a chart as he proceeds. Fig. 9 exhibits two continuous line *circles*, as data, the outer having a radius of 70°, the inner a radius of 10°. The outer dotted line shows the limits of visual perception of my own right eye. The continuous line within the

inner circle shows the boundary within which I can read an unknown letter of Snellen's No. 8 test-types; and the inner dotted line, which exhibits the entire field of vision of a patient with pigmentary retinitis, may serve to illustrate some of the clinical uses of the perimeter. The last two outlines were drawn from the fixing point as a centre. In mapping the field of vision, it is of course possible to proceed in any order; but there are obvious advantages in pursuing a regular method. I usually commence from zero, with the quadrant vertically down-

FIG. 2.

wards, and move it upwards towards the temporal side of the eye under examination. The charts may be filled either as maps of the field, by placing the marks in directions corresponding to the positions of the quadrant (*e.g.*, below the centre when the quadrant is downwards); or as maps of the percipient portion of the retina, by placing the marks in contrary directions (*e.g.*, above the centre when the quadrant is downwards). To render them universally intelligible, the same plan should be adopted by all observers; and, of those named, the former is clearly the best.

first because it is more simple, secondly because the maps so drawn will correspond with the inverted ophthalmoscopic image. In all methods of perimetry it is desirable to employ, even for different cases, and more especially for the same case at different times, the same amount of illumination; and this, of course, implies the use of artificial light in a darkened chamber. Even a small diminution of light will decidedly contract the limits of visual perception.

It is sometimes necessary to test the power of recognising colours, a power which may be either congenitally defective or impaired by disease. In determining the fitness of men to be railway servants, or to keep watch on board ship, or to discharge any other duty for which the prompt recognition of the difference between red and green is necessary, the state of the eyes with reference to colour perception should always be carefully investigated; and it is believed by some that in certain cases of impaired sight the presence or absence of this perception is important with reference both to diagnosis and prognosis. A variety of ingenious instruments have been devised for testing chromatic vision; but they are chiefly useful, if at all, for purposes of physiological research. The requirements of the surgeon will be fully supplied by a few pieces of red, green, blue, and yellow paper, or by sets of types printed in these several colours.

The methods of examination hitherto described are all of them applicable to each eye singly; but it is often important to inquire whether the natural muscular and visual harmony exists between the two. The eyes, in a state of rest, are normally a little convergent; directed, that is, to some moderately near point in space. But they should both be directed to the same point, should both become equally convergent or divergent as this point recedes or advances, should both turn to the right or left with equal movement, should be always on the same horizontal plane, should be capable of steady fixation at all reasonable distances, and should see only a single image of the thing looked at, whatever its position with regard to them. These conditions may be tested by taking any convenient small object, such as a pencil, and desiring the patient to look at it, and to follow it with his eyes without moving his head, as it is advanced towards

him and drawn back, or moved successively in various directions, upwards, downwards, laterally, and obliquely. The most common form of disturbed muscular harmony is that which is familiarly known as squint, which declares its existence without any particular examination, and which requires more detailed consideration than it can receive in this place. But there are many varieties of disordered muscular action which are not sufficient to produce permanent squint, and which only become apparent when the eyes are turned in certain directions. Suppose, for instance, that the left internal rectus had become somewhat weakened. There would be nothing obviously amiss until the patient attempted to turn "eyes right;" when the left eye would lag behind its fellow, and would thus fall out of proper parallelism. The image of the object looked at would be formed on the yellow spot of the right eye, and on a point on the temporal side of the yellow spot of the left eye, and the two images would no longer be combined. There would be double vision, or diplopia, and the images would be crossed; that of the right eye being referred to the actual position of the object, that of the left eye more or less to the right of this actual position, according to the degree of the defect. In like manner, if the left external rectus were weakened, the left eye would lag behind when both were turned to the left. The right eye would receive the image on its yellow spot, the left eye on the nasal side of its yellow spot, and the diplopia would be no longer crossed, but direct, the right eye seeing the object in its natural position, the left eye seeing it to the left of that position. The most troublesome double vision is that which is associated with very slight deviation, because, when the deviation is considerable, the second image is formed on a peripheral and comparatively insensitive part of the retina, is from the first of small intensity, and may soon be neglected or forgotten, as we see every day in ordinary squint. But when the deviation is only slight, the second image is formed near the yellow spot, on a highly sensitive part of the retina, and may be nearly as intense as the other. Under these circumstances it often causes great distress, even vertigo, and much uncertainty as to the real positions of objects. Sometimes, in such cases, the deviation is so slight that it is difficult to ascertain by inspec-

tion which eye is at fault; as, for instance, in double vision on looking to the right, whether the left internal or the right external rectus is the weakened muscle. Such a doubt may be resolved by two methods; first, by ascertaining which eye moves to obtain correct fixation when the object looked at is suddenly concealed from the other; secondly, by ascertaining whether the images are crossed or direct. For example, on looking to the right, if the right eye were lagging behind, it would move towards the object as soon as a screen or the hand was so placed as to conceal that object from the left eye; while, if the screen were so placed as to conceal the object from the right eye, the left, being already properly directed, would make no movement; and again, if the left eye were lagging behind, it would be the one to move under the assigned conditions. With regard to the relative positions of the two images, that which is formed on the yellow spot is generally so much the more intense that it can be readily distinguished from the other; but, if this is not the case, we give a lighted candle as an object of vision, at a distance of eight or ten feet, and cover one eye only with a slip of red glass. The red image, whether it be on the right or left of the other, will of course be that of the eye over which the red glass is applied, and in this way the relative positions of the images can be rendered certain.

There are a few rare cases, occurring chiefly in myopic persons, or in those whose eyes are congenitally of different refraction, in which deviations do not produce diplopia, because binocular vision has never existed. The eyes of such people are practically independent organs; and it sometimes happens that one of them is used for near, the other for distant objects. A simple test of the possession of binocular vision is to hold a printed page at a convenient reading distance, and to read it with both eyes. Then, still keeping the eyes fixed on the print, hold a pencil between the eyes and the page, six inches nearer than the latter. If the person trying the experiment has binocular vision, he will see two rather indistinct images of the pencil, neither of which will obstruct his reading by cutting off any word or letter from his view. If he has not binocular vision, or if, having it, he closes one eye, he will see only one image of the pencil, and this, as an opaque object, will obstruct his reading

by concealing words or letters in proportion to its size and thickness.

When the sight of one eye is very defective, we may have want of co-ordination without diplopia; and, in such a case, the defective eye usually wanders outwards, being unrestrained by visual sensations. When the sight of both eyes has been defective from early infancy, as in cases of congenital cataract or of cloudy cornea from purulent ophthalmia, the directing muscles, having never had the guidance of clear images, never acquire their normal tonicity and fixing power. The eyeballs are rendered permanently unsteady, and oscillate in a curious rhythmical fashion, which has received the name of nystagmus.

Before leaving the examination of the muscles, it is proper to test the power of the internal recti to maintain convergence. For this purpose the patient is told to fix the gaze upon some small object, which is then brought rapidly to within about four or five inches of the eyes, the surgeon observing whether they remain steadily directed towards it. The object is next screened from one of the eyes by an intervening hand, this eye being still watched over the edge of the hand. If the internal recti are strong, both eyes will remain fixed in the direction of the object, but if they are comparatively feeble, the eye from which the object is concealed will wander outwards as soon as it loses the visual sensation. The state in which this happens is described as "insufficiency" of the internal recti muscles; and is met with as a not uncommon complication of other forms of disorder.

ON THE RELIEF OF TOOTHACHE BY BICARBONATE OF SODA.

BY DYCE DUCKWORTH, M.D., F.R.C.P.,

Assistant Physician to St. Bartholomew's Hospital.

I ONCE read somewhere, but cannot now refer to the passage, that toothache might be relieved by holding solution of bicarbonate of soda in the mouth.

A very severe case in the person of a boy came before me lately, and an open molar tooth was the source of the trouble. I tried to afford relief by rubbing chloroform outside the cheek, and by putting some on cotton-wool inside the auditory meatus. These procedures failed. I next placed a plug of cotton similarly saturated into the cavity of the tooth. This also failed to give any relief. I was surprised at this, as I had frequently thus used chloroform with success.

I next saturated a small plug of cotton-wool with pure carbolic acid, and inserted this into the tooth-cavity. No abatement of the pain followed. I again tried chloroform, but in vain.

As a last resource I employed a solution of bicarbonate of soda, and to my astonishment the pain ceased almost suddenly, and complete relief was secured. I suppose I put about half a drachm into an ounce of water.

This solitary case seems worthy of record, as it may lead others to try the method adopted here. The remedy is within easy reach, and is very simple. It is difficult to offer an explanation of the *modus operandi* in the above case.

A mouthful of cold water will sometimes prove sufficient to remove the pain in toothache. I cannot now remember whether

I tried this plan before using the solution of soda. Bicarbonate of soda is, however, a decidedly sedative remedy in certain conditions, and in proof of this may be mentioned the relief afforded by it in irritable conditions of the stomach, and in the itching of eczema.

It struck me as noteworthy that a somewhat feeble alkaline solution should produce so decided an effect after the application to the sensitive dentine of a powerful agent like carbolic acid. If the toothache is excited by unhealthy (acid) saliva, or buccal secretion, it becomes intelligible that an alkaline solution should rectify this.

In a future case I shall at once employ a *warm* solution of bicarbonate of soda, and thus I shall look for an unequivocal result. It would also be well to test the reaction of the saliva and of the buccal mucus in cases of toothache, with a view to ascertain their possible influence upon the surfaces of carious teeth.

The pathology of saliva is as yet, so far as I know, an uncultivated field, but I believe, if it be looked for, that this secretion will be more often found to possess an acid reaction than is generally believed or taught ; and I also think that useful therapeutical hints may be gathered by the employment, at various intervals, of litmus paper in the mouth in many cases of dyspepsia and chronic disease.

ON THE MONOBROMIDE OF CAMPHOR.

BY ROBERT LAWSON, M.B. (EDIN.),

Pathologist and Assistant Medical Officer, West Riding Lunatic Asylum.

SOME months ago[1] I had the privilege of publishing in the *Practitioner* a few observations on the physiological and therapeutic actions of camphor and its monobromide. The conclusions which at the time of writing I had reached regarding the latter drug were to a certain extent confirmatory of those recorded by Dr. Bourneville in a paper published by him in the *Practitioner* of August last. But to induce the cerebral and other altered conditions specified by him as resulting from the use of the substance, I required to administer larger doses than Dr. Bourneville appears to have done. The inference was that my preparation was probably not of the unexceptionable quality which scientific investigation imperatively requires. Consequently, at the time when I prepared my former paper, I was waiting for the arrival of new specimens of the monobromide. Through the kindness of Dr. Crichton Browne I obtained from Messrs. Smith, of Edinburgh, and Messrs. Davy, Yates, Routledge and Co., London, thoroughly reliable and specially prepared samples of the new substance. With these specimens I have made a long series of observations on guinea-pigs, rabbits, and dogs. The result is, that though I have succeeded in demonstrating to my own satisfaction that the drug possesses, as stated by Dr. Bourneville and others, marked hypnotic and calmative properties, yet the fact still remains painfully evident that many apparently unavoidable impediments stand in the way of its employment in practical medicine. The most im-

[1] *Practitioner*, November 1874.

portant of these were referred to in my previous communication. The comparative insolubility in anything but irritating media is a serious obstacle in the path of anyone who sets out with the intention of employing medicinally either camphor or its new compound. The great irritation of the gastric mucous membrane which both of them are liable to produce is another serious impediment in the way of their general employment in medicine. The excitability and wasting following upon such a derangement of the *primæ viæ* supply another serious contra-indication. This is more especially notable, inasmuch as in the many disorders characterised by sensory, motor, and ideational excitement, such as delirium tremens, hysteria, &c., there already exist in most cases an irritable condition of the gastric mucous membrane and a tendency to wasting. And though in such cases the monobromide of camphor might at first sight appear to be indicated as a likely drug to act upon the nervous disorder, yet one would naturally be cautious in prescribing in such cases a remedy which is capable of intensifying a condition of the mucous membrane which in itself is more or less conducive to the maintenance of the nervous derangement.

The observations which I intend to embody in this paper have, for several reasons, been mainly physiological. The therapeutical experiments which will be found in the paper of November last will show with sufficient clearness that the monobromide of camphor is not a drug suitable for administration in asylum practice. The pathological conditions with which one has to deal in such practice are so frequently characterised by advanced degenerations or modifications of vascular nervous or accessory textures, that more potent agents must be employed in their treatment than those which would be sufficient to allay irritation due either to functional disturbance or temporary alterations of peripheral or cerebral states. In addition it will be quite evident that the difficulty experienced in dispensing the drug in a soluble and active form is even greater in asylum than in general practice, and that the want of a useful and safe formula for hypodermic injection is in itself almost sufficient to necessitate its exclusion from the pharmacopœia of most lunatic asylums.

The principal conclusions derivable from the use of monobromide of camphor in sufficient quantities are, that it produces sleep which is sometimes interrupted apparently by hallucinations or delusions; that it lowers the pulse, the temperature, and the respirations; and that the continued use of the drug causes impairment of appetite and loss of flesh to a dangerous extent. Further, it is observed that when indubitably fatal doses are administered, the temperature sinks gradually and without recoil till the death of the animal operated upon; but when smaller though still fatal doses are given, the temperature falls to a certain point, then rises slightly, but eventually sinks without intermission till life is extinct. The small vessels visible in the ears and the eyelids contract considerably in their calibre while an animal is under the influence of the medicine. When the temperature is maintained by artificial heat, the poisoned animal frequently makes a complete recovery from the effects of a dose which otherwise would have been certainly and rapidly fatal. Though it is rather exceptional to produce convulsions by the administration of the monobromide of camphor, I noticed in the course of my observations that almost all the animals operated on had occasional seizures of shivering, which affected the whole body and limbs, and which, though probably due to the decline of temperature, were characterised by all the phenomena of a clonic convulsive attack. Shortly after the exhibition of the drug, either by the mouth, the rectum, or hypodermically, an orange-coloured fluid was in most cases either vomited or voided from the bladder, and not unfrequently a motion was passed in addition.

The following is a statement of the alterations in temperature, pulsation, and respiration produced by a moderate dose of the monobromide:—Eight grains were administered to a guinea-pig, whose cardiac pulsations were 166, respirations 75, and temperature 99°. In forty-five minutes the pulsations had fallen to 140, the respirations to 68, and the temperature to 97°. In another hour the pulse was 140, the respirations 50, and the temperature 96°. In an hour more the pulse had almost regained its starting-point, and the respirations and temperature had commenced a slow but steady progress towards complete restitution. During the greater part of the time the guinea-pig was quite

immobile and flaccid. Again, a black-and-tan terrier was injected with 8 grains of the drug. Before administration the respirations of the animal were 32 per minute, and the pulse 186. In an hour the former were reduced to 15 and the latter to 170. In an hour more the pulse was 144 and the respirations about the same as during the previous hour. The dog was quiet and lethargic, but did not sleep except at intervals. In the animals concerned in both these observations there was little alteration in the size of the pupils. Twenty-four grains were administered to a large rabbit. The solution was injected into the rectum. In about half an hour a fluid motion containing some of the drug was passed. At starting the pulsations were 150, the respirations 100, and the temperature 101°. Vessels at the root of the ear having a calibre of $\frac{1}{18}$ of an inch were noted. For some time the animal manifested an excitement which was probably due to the pungency of the injection. In an hour the pulsations were 156, very weak, and almost impalpable; the respirations were reduced to 82, the temperature to 96·6°, and the vessels determined on were not visible to the naked eye. In an hour more the pulsations were imperceptible, the respirations 88, and the temperature 91·2°. In another hour the heart was performing 90 ventricular contractions of a reduplicated character, the respirations were 88, and the temperature 82·6°. From the very beginning of the observation the rabbit lay prone and fell into a dazed state. For half an hour it continued in this attitude and condition, but at the end of that time gave a sudden start and almost fell from the table on which it had been placed. For a minute or two it moved about restlessly, and was apparently unconscious of its surroundings. With its limbs flaccid and unable completely to support its weight, it advanced in any direction towards which its head was placed, and sometimes revolved on its hind legs for several revolutions at a time. At the end of the first hour it was quite helpless, and lay on one side, having its eyes half open. The expression and attitude were those of sleep. It allowed itself to be held or placed in any position without struggling, and when the head was raised, voluntarily or involuntarily, from the table, it nodded, first extending the neck slowly, then allowing the head to fall forward with a jerk. Subsequently the animal made sharp

movements with the fore-paws as if to remove some irritating substance from the face. Occasionally it pulled itself together as if to move; but though when recumbent its legs were quite active, they were utterly unable to support the weight of the trunk. Consequently the body rolled over, and the animal fell helplessly upon its side At times also it started up suddenly, and by the use of the muscles of the trunk threw its body forward as if jumping from some impending danger. Reflex irritability appeared to be present as the animal retracted its limbs when pinched, and when the face was blown upon (an action very irritating to several of the lower animals) it tried to start back without being roused from stupor, and, after the ineffectual effort, commenced to scream. This noise lasted for about a minute, and was renewed by repeating the same irritation. During the second hour the hypnotic condition was intensified. When placed on the floor the animal lay sleeping for some time, then at intervals endeavoured to make a sudden dart forward, but invariably rolled on to one or other of its hind-quarters. The hind limbs always gave way most readily, either because they were most affected, or because they are more essential to the process of progression. In another hour the rabbit was found sleeping, but still continued to rush forward at intervals as before. These movements were evidently prompted by some subjective stimulation, as they occurred unexpectedly with marked suddenness and during the absence of any sensory excitement such as would have been likely to induce them. In the intervals between these movements the animal was in a deep sleep. Next morning it was found dead, and presented appearances which favoured the presumption that it had died in convulsions.

Nothing could be more certain than the fact that in all cases in which monobromide of camphor is administered for the sake of physiological observation, the temperature falls. Observations regarding the respirations and the heart's action are open to fallacy. Timid or terrified animals exhibit a natural excitability when undergoing examination previous to medication, and even though the average of several days is taken as the normal index of pulmonary and cardiac activity, the probabilities are that the number of inspirations and impulses deter-

mined on is greater than is natural to the animal under observation. Owing to this unfavourable circumstance the action of a calmative or hypnotic medicine on these functions is perhaps somewhat greater on paper than it is in reality. But that a depression of cardiac and pulmonary activity does result from the use of monobromide of camphor is evident, not so much from the difference between the numerical index immediately before and after medication, as by the steady decline which occurs when the animal, overcome by the drug, is in a state of indifference, and not amenable to the action of extraneous excitement. Further proof is afforded of the undoubted occurrence of such a depression by the tendency to a climacteric struggle towards the restoration of the vital powers, when, previous to the fatal issue, the temperature and even the pulse rise temporarily towards the starting-point, and then, in suitable cases, fall continuously till death. But if in the instance of the thoracic functions there is some room for fallacy, there is no difficulty in demonstrating the fall of the rectal temperature. While under the influence of sufficient doses the vital heat of an animal generally falls about two degrees during each of the first two hours of observation, and then either rises or continues to fall according to the extent of medication.

It is unnecessary to enter into the complete details of numerous other observations regarding the action of monobromide of camphor. It is sufficient to state that they are tolerably constant. A 12-grain dose administered to a large rabbit, for instance, brought the pulse down 30 beats and the respirations about 20 acts per minute, while the temperature previous to a climacteric rise had fallen 5 degrees. The records of other observations show similar results equivalent in degree to the dose administered. The physiological employment of the drug in the reduction of the human thoracic functions and the temperature invariably leads to a contra-stimulation or a depression such as observations on the lower animals would entitle one to expect. It is sufficient therefore to recapitulate the conclusions, that under the influence of the monobromide of camphor animals manifest a marked tendency to fall into a deep sleep, which is apt to be interrupted by occasional delusions or hallucinations; that during this sleep the pulse, respirations,

and temperature undergo a numerical decline; that visible blood-vessels become considerably contracted in calibre, and that in some cases epileptic convulsions occur during the operation of the drug. Dr. Bourneville noticed these convulsions in cats alone; and as my observations on the lower animals have been confined to guinea-pigs, rabbits, and dogs, I have not observed such seizures as he refers to. In almost all the animals employed, however, I have, as already stated, seen a general muscular twitching which was most probably convulsive in character. This phenomenon occurred, however, when the temperature was at its lowest, and, if convulsive, may have been directly due to the reduction of animal heat. On the other hand, the true epileptic convulsions which Dr. Bourneville observed in the case of cats took place at the time when, after the first ebb of temperature, there was a struggle towards the restoration of normal activity as manifested by the rise of the thermal index.

These and the other published observations regarding the monobromide of camphor naturally recall the initiatory problem—What is the therapeutic value of the drug? Does it merit admission into the long list of substances used as medicines? It will, I think, be sufficiently evident by this time that the therapeutic value of the drug is not sufficient to entitle it to a place beside the many calmative and soporific medicines which are analogous to it. Many of these are certainly superior to the monobromide in the suppression of sensory, motor, and cerebral excitement, and none of them possess so many inherent bad qualities as a therapeutic agent. I have already sufficiently referred to the disadvantages arising from the insolubility of the drug, and the gastric irritation which, even though vomiting is not produced, is liable to result from its administration. In the hypodermic use of the drug it is an additional drawback that the viscid solution in glycerine and alcohol obstructs the syringe-needle either by clogging or by the formation of crystals during injection; and though the observation may appear a trivial one on paper, the circumstance is liable to cause great annoyance and inconvenience in practice. It is clear in the face of this detrimental

evidence, that as the monobromide has not been advanced as a specific, its value can be established only by favourable comparison with drugs possessing analogous properties. By glancing briefly at the substances which are accepted as indubitably possessing the therapeutic features claimed for the medicine under consideration, it will be seen how far the latter falls short of the potency and fitness possessed by the former. Opium, chloral, cannabis indica, bromide of potassium, belladonna, hyoscyamus, conium, ergot of rye, valerian, assafœtida, and all diffusible stimulants, possess the capability of performing, either directly or indirectly, one or other of the many medicinal functions ascribed to the new drug. In several of them we have in a handy, soluble form, the means of producing sleep, uninterrupted by the vagaries of delusion or the promptings of repulsive hallucinations. In some of them we have medicines which are eminently narcotic and still leave little or no trace of gastro-intestinal irritation. In both respects the monobromide of camphor is at fault, as the hypnotic condition induced by it is broken by the evident influence of painful subjective impressions, and the administration of it is apt to be followed by acute gastric catarrh and secondary impairment of tissue nutrition. In such conditions as are present in delirium tremens, hysteria, and other diseases affecting the sensory, kinetic, and intellectual centres, and generally associated with some concurrent disorder of the *primæ viæ*, there is no necessity for falling back upon a doubtful medicine for the production of a calmative effect. It is to be feared, perhaps, that the means already at our disposal for such a purpose have been too freely used when attention should have been more steadily directed to recuperative and radical measures. The same observations apply equally to chorea; and with regard to the suppression of convulsive seizures, it is difficult to imagine that monobromide of camphor will ever supersede chloral in procuring central exemption from peripheral or internal irritation; or that by its power of contracting vascular calibre it will take the place of bromide of potassium or ergot of rye in the endeavour to modify the blood-supply to irritated centres. Though there is no doubt that by virtue of its hypnotic properties monobromide of camphor may, when administered in sufficient quantities, pro-

duce sleep in insomnia, subdue emotional, sensory, and motor irritation in hysteria, control convulsions, and even overcome the excitement of delirium tremens, yet it is evident that the drug cannot operate with the certainty and safety which characterise the analogous action of other well-known and time-honoured medicines. If, in addition, the risk of exciting cutaneous inflammation by hypodermic, and gastric catarrh by oral administration be considered, it must be acknowledged that monobromide of camphor is an agent distinguished on the one hand by the absence of independent or special therapeutic value, and on the other by the presence of several faults, from which many analogous and more potent substances are altogether exempt.

ON THE SUCCESSFUL TREATMENT OF A CASE OF PERITONITIS AND DIPHTHERIA BY DIGITALIS.

BY JOHN HADDON, M.A., M.D., ECCLES.

My experience of diphtheria has been very limited, but the administration of digitalis in the case I am about to relate was followed by such decided improvement that I have thought it worthy of being put before the profession, hoping that those who have the opportunity will test the power of digitalis in such cases.

Mrs. S., aged 24, the mother of one child, which she ceased to nurse in September 1873, had not felt well for about a fortnight before December 13, 1873, when she went to Manchester in the omnibus. During the first half of the journey she sat directly opposite a woman who was ill, and who told the person sitting next to her that she had a sore throat, and that her husband had to fetch a doctor in the middle of the night, she had been so ill. Before Mrs. S. left the omnibus, she shivered. On reaching home she felt some pain in the abdomen, and went early to bed. About one o'clock next morning the pain became excruciating, but was somewhat easier at night when I first saw her.

I found that she was a week past her menstrual period, that her tongue was dry and covered with a white fur, that her bowels were confined, that there was pain and tenderness all over the abdomen, especially in the right iliac region, that there was no fulness in the vagina, that the cervix uteri was flabby and painful on pressure, that the pulse was 140, and temperature 99·4°. Poultices were applied to the abdomen, castor oil given to open the bowels, and milk and beef-tea ordered as diet.

Dec. 15.—She passed a restless night, the bowels remained unmoved, and the abdomen was somewhat distended. Eight grains of calomel moved the bowels freely.

Dec. 16.—She had a quiet night. Still the pain continued, and the abdomen was tympanitic. The bowels were moved by enema. Ordered one grain of opium every three hours.

Dec. 17.—She had a restless night, and in the morning vomited a quantity of bile. The pain was not so severe, but the abdomen continued tympanitic. Suppositories of morphia were now used instead of the pills, every four hours. From this date the bowels acted freely.

Dec. 18.—She began to menstruate. The pain gradually subsided till it was only felt on pressure over the right iliac region.

Dec. 22.—The suppositories were discontinued, and the abdomen was flaccid. The tongue was very red. and she complained that her throat felt slightly sore, but she swallowed well.

Dec. 23.—She seemed much in the same state, but her pulse at night was 140, with occasional intermissions, and on firmer pressure I counted only fifty beats at the wrist.

Dec. 24.—She had had a good night, but the throat was very painful, and she also complained of a pain over the sternum. On examining the throat I found a white pellicle through which red points could be seen, completely covering the uvula and extending from its base, right and left, over the lower part of the soft palate, leaving a V-shaped part, above the uvula, free from any exudation. There was no pellicle to be seen anywhere else. Touching the pellicle with a spoon caused great pain. The pulse was excessively weak, irregular, and intermittent. She was ordered a gargle of permanganate of potash, and a mixture containing perchloride of iron and chlorate of potash, wine and beef-tea, and strict injunctions to keep the horizontal position.

Dec. 25.—She had a bad night, having fainted several times and been very sick. There was great difficulty in swallowing. The pulse was very irregular and intermittent. The pellicle had extended over the soft (with the exception of the V-shaped portion) and to the hard palate. One or two white specks could be seen on the back of the pharynx, which was altogether of a very red colour. The medicine was ordered to

be discontinued, a gargle of hydrochloric acid to be used, and beef-tea and brandy to be given per rectum, till the stomach would retain it. The abdomen was normal, with the exception of fulness and tenderness in the right iliac region.

Dec. 26.—She had a very poor night, but can now swallow more easily and is not sick. She takes brandy and beef-tea. The pellicle has extended to the posterior half of the tongue. The back of the pharynx is quite clear. The pulse cannot be counted, it is so weak and irregular. Motion can be felt in the radial occasionally, and that is all. She says she feels her heart stopping, and thinks she is dying. Ordered one teaspoonful of the following mixture every hour:—

℞ Inf. digitalis conc. ℥j
Tinct. nucis vomicæ ℥ij.
Spr. chloroformi ℥ij.
Aquam ad. ℥ij.

The dose of digitalis is here equal to half an ounce of the ordinary infusion.

At night she felt much better. The pulse was steady, 120, and she had no fainting feeling.

Dec. 27.—She had a good night. She was able to swallow well, although the throat was painful. At night the pellicle was beginning to peel off the palate. The fulness and tenderness remain in the right iliac region.

Dec. 29.—She had very little pain on swallowing, and was able to sit up in bed a little.

Dec. 31.—The throat was almost free from pellicle, and there was no pain on swallowing. There was still fulness and pain in the right iliac region.

She went on well till the 4th of January, when early in the morning she had great pain in the bowels, and was sick. The abdomen was somewhat distended, with pain on pressure over the lower part; poultices were applied. On Jan. 5 the pain was not so great. The fulness in the iliac region had disappeared, and her convalescence was uninterrupted.

Remarks.

The principal points of interest in this case seem to be:

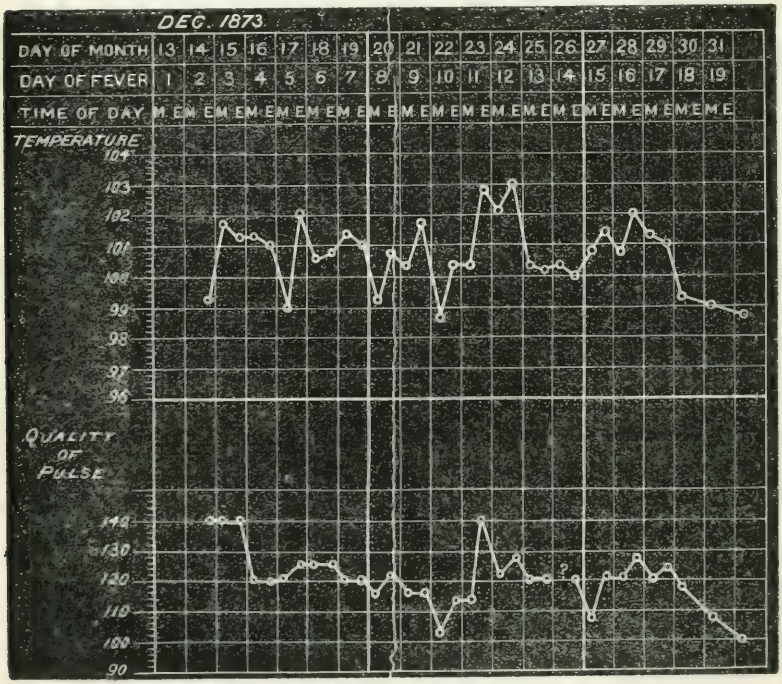
1. That the infection of diphtheria must have been received in the omnibus, because she had not been out of the house for many weeks, and there was no diphtheria in the district.

2. The abdominal mischief. Was it dependent upon, or altogether independent of, the poison of diphtheria?

3. The disordered action of the heart, probably of a paralytic character, which disappeared so quickly after the administration of digitalis.

4. The course of the temperature, which shows that when the diphtheria began to be developed the temperature rose, remained high till the fourth day, when it fell nearly three degrees, and remained low, with evening falls, while danger lasted; but began to rise when the symptoms improved, and continued to rise till the eighth day, when it fell, to reach the normal.

Appended is a diagram of the temperature and pulse throughout.



FOUR CASES OF HÆMATURIA, WITHOUT ALBUMEN, CONSTANTLY ALTERNATING WITH LARGE DEPOSITION OF URIC ACID.

BY E. J. SHEARMAN, M.D., M.R.C.P., F.R.C.S., F.R.S.E., ETC.

Physician to the Rotherham Hospital.

THE following cases of hæmaturia, unaccompanied by albumen in the urine, which have presented themselves during the last twelve months, are, to me, so unusual, interesting, and apparently without structural disease, that I am anxious to relate them to the profession, in the expectation of finding some of my medical brethren able to account for such abnormal occurrences.

CASE 1.—On the 1st October, 1873, T. D., a butcher, aged 50, who had led a very irregular life, consulted me respecting a frequent inclination to urinate a thickish brown fluid, which, after depositing, on microscopic examination with ⅛th objective, was found to consist entirely of blood-discs and mononuclear celled epithelium; the specific gravity of the clear urine was 1035°, acid, no albumen, no granular casts, no uric acid or oxalate of lime, but an unusual quantity of urea. He complained of pain in the loins, particularly after walking exercise, but no renal colic or pain in the testicle. There was such a large quantity of blood, that I, at first, suspected it came from the urethra: but satisfied myself it did not. His digestive organs were out of condition, but after strict attention to diet and a little attention to medicine this state was corrected. The blood-discs and epithelium did not diminish; and I administered gallic acid, which very shortly stopped the bleeding; but it was immediately replaced by an enormous quantity of very large crystals

of uric acid. On correcting this by alkalies, the blood reappeared in full quantity: and this interchange was kept up for six or eight weeks. The only complaint he made was of a heavy pain in the loins. Eventually, counter-irritation, the use of a hot hip-bath every night, and a course of buchu, gallic acid, and glycerine, gradually lessened the excretion of blood, and at last it entirely subsided. I have seen this man lately, who assures me he has never passed a calculus, and is now quite free from the complaint.

Case 2.—A gentleman, aged 76, who has for many years suffered from mental anxiety, and twenty years ago from gall-stones for several years, consulted me on 28th May, 1874, in consequence of having an unusual deposit in his urine: all he complained of was a frequent desire to empty the bladder; no pain in the loins or testicle; digestive organs in pretty good condition. He had, certainly, his skin chilled a few days before this took place. The urine was a dark brown colour, specific gravity 1035°, acid, and after depositing twelve hours, on microscopic examination with $\frac{1}{5}$th objective, the deposit was found composed entirely of immense quantities of blood-corpuscles and epithelium, with a very little uric acid; no granular casts. There was no albumen in the clear urine, but a good deal of urea; and on boiling and adding nitric acid to the deposit, there was not an atom of albumen. I had been in the habit of frequently testing this patient's urine, microscopically, and never discovered a blood-disc before. I suspected some kidney concretion had scratched or ulcerated the uriniferous tubes or calyces, and for two or three weeks treated him on that principle without the least good effect. I then prescribed counter-irritation and gallic acid, which at once stopped the bleeding, but immediately produced a very large quantity of large uric acid crystals. As soon as I diminished this excretion the blood-discs reappeared in enormous quantities, without albumen or mucus. This alternation of blood and uric acid continued for another month or six weeks. At last I put him under a course of buchu, glycerine, and small doses of gallic acid, and the blood-discs gradually disappeared and have never returned. No calculous concretion has ever been passed, nor has he suffered from renal colic.

Case 3.—A married lady, aged 26, who has brought forth a child every year for six years, and had lately been confined and is now nursing, consulted me on 17th October, 1874, for a severe pain in the back and loins and a sensation of excessive exhaustion almost amounting to syncope, which had existed six months: otherwise she appeared in good health. She passed very little urine, which was acid, specific gravity 1010°, clear and colourless, and after depositing, contained innumerable blood-discs and epithelium; no casts; no albumen, urea, mucus, or uric acid. I at once administered gallic acid, with the view of ascertaining if, by checking the blood, uric acid would be secreted: and this was the effect, at once. On using remedies to check the uric acid, blood again reappeared, and this alternation is still going on: but there are no granular casts or albumen.

Case 4.—A very rheumatic, delicate lady, aged 70, whom I have attended thirty years, and who has consulted many eminent physicians, all agreeing on one point—a rheumatic diathesis—has been for many years suffering from attacks of acute spasmodic pain in the stomach in the middle of the night. She became, on the 27th August, 1874, very suddenly excessively exhausted and faint: she had lost flesh and weight quickly, and neither food nor medicine relieved her: she complained of no pain, but a feeling of exhaustion which could not be accounted for. I now examined her urine, which far exceeded the normal quantity, looked albuminous, was acid, specific gravity 1009°; no albumen, no uric acid, oxalates, casts, or mucus; but the deposit, after twelve hours, was entirely composed of blood-corpuscles and epithelium; and the blood and urine were in such large quantities as to explain at once the nature of the case and account for her exhaustion. As her stomach has always been very delicate, I at first prescribed extract of krameria, which in a few days reduced the quantity of blood-discs, but these were immediately replaced by large crystals of uric acid: and as the blood decreased the uric acid increased: but the check put to the excretion of blood relieved her at once from that feeling of excessive exhaustion, and she began to gain weight. The uric acid so increased during the use of krameria, that I was compelled to put her under an alkaline treatment: this,

again, immediately brought back the blood. I then tried perchloride of iron and very small doses of strychnia, which diminished the quantity, but did not stop it. She has no pain in the loins, no disease in the bladder or urethra: but, in consequence of her stomach being so irritable and soon put out of condition, she certainly has not taken sufficiently nourishing food for some years. Since I discovered this hæmorrhage I have induced her to improve her diet, and she has increased in strength, flesh, and weight. The uric acid, however, still alternates with the blood excretion, but the quantity of both is gradually decreasing. She has never passed a calculus.

In the foregoing cases there was not a symptom of pyelitis, no serum of blood in the urine, no mucus, no albumen, no renal colic; but an enormous quantity of blood-corpuscles, which in every case, when checked, were immediately replaced by very large crystals of uric acid: and when the uric acid secretion was checked, blood-discs in immense quantities reappeared. In one case, the loss of blood was so great as actually to produce syncope. I have been in the habit, for many years, of testing the urine of nearly all my patients, and have exhibited these specimens to some of my professional neighbours, who are quite as much surprised at the absence of albumen as I am, taking into consideration the large quantity of blood-discs.

When the urine is acid, albumen is generally soon deposited, by boiling and adding nitric acid: and when I saw, most plainly, such a quantity of blood-corpuscles in the cases I have described, without being able to detect an atom of albumen by this process, I consulted every good authority I knew on the subject; feeling that if even the kidneys could possibly be in such a condition as to excrete blood-corpuscles without serum, it could not happen in four consecutive cases; and that the hæmato-globulin of the blood-discs alone contains sufficient albumen to be plainly tested. I therefore procured some fresh *pure* nitric acid from Messrs. Horne and Thornthwaite; used small test tubes with a drachm of the urine containing the blood-corpuscles, to which I added, successively, 5, 15, and 30 drops of the new nitric acid, *both before and after boiling;*

watched the effect of each at least twenty-four hours, and *then boiled it again*, and still no appreciable albumen was deposited. Fearing my nitric acid might be too strong, I diluted it—with no better success. After boiling the blood-corpuscles, without nitric acid, in a very small tube, instead of any deposit, there was a sort of little adhesive mass formed, which left a mark round the top of the small quantity of urine. I am aware there is a peculiar kind of albumen in some urine, which is first *deposited* and then *dissolved* by nitric acid: this I ascertained was not the case in these specimens. Whenever there was blood in these cases the urine was always acid enough.

Since these cases were written I have become acquainted with a note of Dr. Brown-Séquard's "On a rare cause of mistake in testing urine for albumen," in No. 3 of his *Archives of Scientific Medicine* which I had not seen before, and take the liberty of quoting: but this does not solve the difficulty:—

"For well-known reasons it is important that the urine tested by heat be at least slightly acid; but, as I will show by what occurred to me in three cases, we might conclude that there is no albumen in naturally acid urine that does, however, contain a notable quantity of it. If we first test, by heat, urine containing albumen (after having ascertained it is naturally acid), we may not find the least precipitate; and if we add nitric acid to it after it has been boiled and become somewhat cold, we may yet not find a precipitation of albumen. But if we boil a second time that now acidified urine, the deposition of albumen quickly takes place, and the precipitate soon appears. This is, certainly, what we see in almost all cases; but I have found that it is not always so. In three instances, in which the microscope showed tubular casts of the urine, the albumen contained in this fluid was so modified by heat, that if the urine (which was naturally acid) was boiled first, the addition of nitric acid, in small or in large quantity, at a low temperature, or at the degree of boiling, produced no solidification of that protein substance. Had I been contented with that mode of testing urine, I would have concluded that there was no albumen in those three specimens. But when I added either a small or large quantity of nitric acid to the fresh (unboiled) urine, and then boiled it, the ordinary coagulation took place; and after some time of rest,

the ordinary precipitate appeared. It is evident therefore that there is, sometimes, in the urine, a kind of albumen which loses its coagulability by boiling."

Case No. 4 is still under my inspection: she has had neither blood nor uric acid in her urine for the last month: if blood should reappear, I will have the urine again carefully examined, and continue the history of the case in some future number of the *Practitioner*.

Reviews.

On the Curative Effects of Baths and Waters; being a Handbook to the Spas of Europe. By Dr. Julius Braun, including a chapter on the Treatment of Phthisis by Bathing and Climates, by Dr. Rohden. An abridged translation, with Notes, by Hermann Weber, M.D., F.R.C.P. 8vo. pp. 365. London: Smith, Elder, and Co., 1875.

This large volume, of which the title sufficiently describes the contents, supplies the most scientific exposition we have of the general principles of Balneology. Dr. Braun, whose book has reached a third edition, has brought much critical acumen to his task,—in fact, his critical spirit is at times apt to lead him into the extremes of scepticism. He is unwilling to admit the beneficial effect of waters of established reputation, whenever he cannot satisfy himself as to the theory of their mode of operation. Thus, he evidently believes earthy and indifferent baths to differ in no essential respect from baths of ordinary water of the same temperature. He considers that, for instance, the baths of Wildbad, of Teplitz, or of Bath, effect nothing which baths of common hot water will not do as well. While we grant that the theory of the operation of hot water is not very intelligible, and that the at present popular view (to which, by the way, he does not allude), that they owe their virtues to certain electrical action, is vague and indefinite, still the cures often wrought by them are certain, and we are not at liberty to set them down to the effects of imagination merely because we cannot explain them.

Dr. Braun probably overrates the value of his own special waters, the *soolbäder* which he employs at Rehme; this is natural enough: but he depreciates unnecessarily the sulphur and chalybeate waters—running down Pyrmont, in particular, quite unfairly; possibly he has sure ground for disparaging lime waters, unless the good effects obtained by his colleague, Dr. Rohden, at Lippspringe, with such waters are to be positively accepted, and not received with a little of Dr. Braun's own scepticism. The former gentleman supplies almost

a complete treatise on the early management of phthisis, and gives an account of its treatment by mineral waters, much of which will be new to most English readers. Both in the early chapters of the work, and in Dr. Rohden's portion of it, there is a full examination of the influence of climate and of air. The subject of mountain resorts is amply treated of, and on this subject especially, as well as by judicious notes throughout, Dr. Weber has been able to add valuable information. He has wisely pruned the disproportionately long account of the stufa of Monsumano, in a long description of which, as being a novelty to him, no doubt, Dr. Braun had indulged. It would be easy to take exception to various little matters in the translation. Martin's Brücke is called Martin's brook; Mittagessen, mid-day meal. Simla is called a Spa. Water is said to be "transmitted," instead of exported. "Liver oil can be supplanted by an innumerable quantity of substances." "Gas is predominantly ejected from the lungs." "We can see no reason why not Cheltenham should be frequented." Then we suppose that the fact that Gastein is rather a dull place, is enunciated in this stilted fashion: "The social life of the place, both from the majestic character of the scenery, and also from the number of very great invalids, has assumed in time a serious character, which tends to produce a certain evenness in the existence of over-excited and irritable constitutions." But a few such blemishes must be allowed for in a work which is essentially German. We agree with Dr. Weber, that Braun's work, although in spirit somewhat controversial, ought to be of much service in diffusing among the profession in England more accurate knowledge on the subject of mineral waters.

Consumption and Tuberculosis; their Proximate Cause, and Specific Treatment by the Hypophosphites upon the principles of Stœchiological Medicine. By JOHN FRANCIS CHURCHILL, M.D. Paris. With an Appendix on the Local Treatment of Respiratory Diseases by Specific Stœchiological Inhalants. Pp. 632. London; Longmans, 1875.

A WORK, the preface of which announces the discovery of a *scientifically-conditioned specific* for the cure of tuberculosis and consumption, coming confidently forward at a time when pathologists are much exercised in mind as to what is tubercle and what is phthisis, naturally arrests attention.

In his first two chapters Dr. Churchill treats of the great prevalence and dire mortality caused by consumption, as well as of the inadequacy of all present methods of cure as testified by quotations from numerous high authorities in this and other countries.

Having thus placed forcibly before the reader the severity and great prevalence of the disease, the author next proceeds to develop a method of certain cure.

The cure of the tubercular diathesis, we are told, consists in the restoration to the system of certain oxydisable phosphorised compounds, the deficiency of which lies at the root of the said diathesis.

These phosphorised compounds are best supplied in the form of various hypophosphites.

The question we now seek to get answered as we proceed further in this big book is, Where is the evidence of a deficiency of oxydisable phosphorus in the system of tuberculous persons?

On this point we do not find any absolutely convincing proof. "We know," says Dr. Churchill, "that phosphorus is one of the constant principles of the system, but that is the limit of our science. Chemistry has not yet been able to prove in what state it is found in the blood, whether as phosphoric acid, or as phosphorus molecularly combined with organic material."

To get, however, at the practical part of the question, we will join Dr. Churchill in "assuming hypothetically the truth of the two following propositions."

"The tubercular diathesis is owing to a diminution in the system of the phosphorus element."

"As this element fulfils the function of a combustible body, it must be at a degree of oxidation inferior to that of phosphoric acid" (p. 27).

As the result of his now greatly extended practice with the hypophosphites, Dr. Churchill feels able most positively to assert, that in no case after the employment of the hypophosphites is death brought about by new tubercular deposit, unless the treatment is completely stopped while the patient is still exposed to the causes which produce tuberculosis.

Turning now to the practical results of the hypophosphite treatment, as given in chapter iv., we find, among seventy-nine cases, tubercular disease was present in one lung only in twenty-five; of this number, eleven issued in complete recovery. Fifty-four patients had tubercles in both lungs, and here complete recovery is recorded in sixteen. Thirty-two, in the second stage of phthisis, had both lungs affected, and among these were thirteen cures. We quote these examples from among a considerable number of statistical reports of carefully-selected cases, to show the practical evidence in favour of the hypophosphites as remedies for tubercular disease, and it is right to say that these figures are taken from the records of Dr. Churchill's dispensary practice in Paris, where the patients come from among the poorer classes.

"Recovery in cases with *cavities in both lungs* was altogether unknown until I stated, in 1864, that I had sometimes obtained this result. Up to that time I had seen three examples of this." For a patient to recover with a large cavity in one lung is by no means exceptional in the experience of physicians, but certainly it is a very rare thing to be able to report a true recovery where each lung is excavated by a cavity. Dr. Churchill's three cases remained in perfect health for several years.

In our own practice with the hypophosphites, we have opportunity of using the soda hypophosphite in many cases of chronic tubercular phthisis, and have found the medicine a most valuable one; more generally useful than any other drug we have employed during the past ten years. It is, however, our misfortune not to have had that success in curing acute phthisis which seems to have fallen to the lot of Dr. Churchill, who, up to 1862, had cured six cases.

In one well-marked instance of acute hereditary tuberculosis we tried the hypophosphite of soda under most favourable conditions; but this salt, in common with other remedies, seemed to have no power in controlling the progress of the disease.

In cases of consolidation of lung of chronic kind, tending to induce tuberculosis, we have found the hypophosphites unsurpassed. In some cases of this description in children, their effect is, as Dr. Eustace Smith says in one of his lately-published lectures in the *Medical Times and Gazette*, almost magical.

So far as our own experience goes we can confirm the necessity for the precautions given at p. 135 respecting the use of hypophosphites. The soda or potash hypophosphite, given injudiciously and in too large a dose, unquestionably may set up rapid and dangerous softening in a tubercular deposit, and the combination of iron with a hypophsophite is apt to prove very exciting to the circulation, and so may induce hæmoptysis. Dr. Churchill commenced his trials of the hypophosphites by himself taking half a grain of hypophosphite of lime, which was gradually increased to six grains in one dose. We cannot find any record of toxic effect produced by the hypophosphites when given with due care; while in his excellent work on the use of phosphorus, Dr. Ashburton Thompson has, in more than one place, drawn attention to the serious accidents that may follow on the careless administration of free phosphorus and free hypophosphorous acid.[1]

We are obliged to pass cursorily over much matter contained in this volume, but would recommend all practitioners to read carefully the chapter on the mode and rules of action of the hypophosphites. Much that is of practical utility in the management of consumptive persons will be found in this chapter,

[1] Ashburton Thompson on "Free Phosphorus in Medicine," pp. 57, 122, 123.

which shows the writer to be a painstaking and competent observer of disease.

The upshot of all that is said in chapter viii. on the theory of tuberculosis, is to show that deficiency of oxydisable phosphorus in the system is the sole cause of the tubercular, or, as Dr. Churchill calls it, the *phospholigic* diathesis. Chemical analysis is admitted as incompetent to demonstrate this condition. Appealing to physiology, we are told that oxydisable phosphorus, being a combustible and calorific element, it follows that when this is deficient there must be a lowering of animal temperature (p. 227). To prove this the diminution of carbonic acid in the expired air of consumptives is quoted, also the tendency to lithic acid deposit in the urine. With respect to lowering of temperature, recent observations, read by Dr. C. T. Williams before the Royal Medico-Chirurgical Society, lend support to the belief that temperature may fall in incipient tuberculosis.

Drs. Hillier and Finlayson have admitted that the morning and evening temperatures may be normal in cases of tuberculosis of children.

Dr. Churchill, as the enthusiastic introducer of a new cure for consumption, is naturally impatient that his remedy is not at once received with open and grateful arms by the profession. We cannot see that now he has much cause to complain. Every new remedy ought to undergo a calm and critical trial at the hands of dispassionate observers: such has been the lot of the hypophosphites; and, as a result, we find a very large number of highly competent physicians have now published cases testifying to the great value of the hypophosphites in the treatment of consumption. Dr. Henri van Holsbeck, after failing in his early trials with Dr. Churchill's remedies, some years after published a long list of successful cases. Dr. Thorowgood, of Victoria Park Hospital, seems to have used the hypophosphites largely and with much success, as have also many others mentioned by Dr. Churchill in his book.

Dr. C. J. B. Williams, in the recent valuable treatise on consumption published by himself and his son, Dr. C. T. Williams, with much fairness and impartiality recognises the decidedly beneficial action of Dr. Churchill's hypophosphites in certain cases. How they act is not certain, for Dr. Williams does not appear to endorse the theory of phospholigy as the cause of tuberculosis. We cannot quite agree with Dr. Churchill in his ingenious demonstration to prove that in 98 cases out of every 100 Dr. Williams must have used the hypophosphites (p. 365).

When we see numerous physicians of repute and experience candidly admitting the valuable properties of the hypophosphites as remedies in many forms of phthisis and tuberculosis,

and when, too, we find these medicines placed among the additions to the British Pharmacopœia, we fail to see that Dr. Churchill has any hard treatment to complain of at the hands of the profession. That the introduction of these medicines has been a great gain to the better treatment of consumption is a point we regard as fully established, and Dr. Churchill deserves well of mankind for what he has done.

Space does not permit us to follow out the theory of stœchiological medicine, the aim of which we understand to be to support and sustain the elementary bioplasm of the system; not a new idea in these days.

We could wish the information as to the stœchiological inhalants were more definite and concise; but, in this chapter, we hear more of the hard measure dealt out to inventors of new remedies by a thankless public and a prejudiced profession than we do of the inhalants. The hypophosphites are put forward in a fair and straightforward manner, as becomes a true physician, and this cannot but contrast unfavourably with the mystery which appears to cloud the stœchiological inhalants.

Medico-Electric Apparatus and How to Use it. By SALT and SON. 8vo. pp. 66. London: Churchill, 1875.

THIS is merely a trade catalogue of electric apparatus issued by a well-known firm of Birmingham instrument makers. It contains nothing, we believe, that has not been published before, but it will be found a convenient book of reference for those who desire information as to the details of construction of many forms of battery. It is profusely illustrated, and the descriptions are clear and concise. The latest improvements in the apparatus described are not always given (this is notably the case with the description of Weiss's continuous battery), and the reader who is not well acquainted with the principles involved in the construction of batteries will receive little help from this work in selecting either one or another form of battery. The work is not free from mistakes. Thus the well-known chain-bands are spoken of as capable of giving a *constant* current. Stöhrer's galvanic batteries are, to our mind, unduly praised, and the obvious criticisms on them, that the cells are unnecessarily large and too few in number, that dust is not prevented from falling into the cells, that the mode of immersion of the cells is clumsy, and that the fact of immersion is liable to be overlooked (so that the battery may be exhausted when not in use), are not made. These are practical points which should have been mentioned in a purely practical work.

The intending purchaser of a battery should by independent inquiry make up his mind as to the best form of element, the

number he wishes to have, the best mode of immersion, the readiest method of regulating the strength of his current, the best form of key and commutator, the handiest rheophore, and the most generally applicable conductor and mode of connection. This information he may get by studying the *principles* of electro-therapeutics, and when he has made up his mind on these points, then and then only, we advise him to go to market.

The Pharmacopœial Companion to the Visiting List and Medical Diaries. By ROBERT T. H. BARTLEY, M.D. London: Baillière, Tyndal, and Cox.

EVERY medical man has occasionally found his memory at fault as to the exact dose of a remedy he was about to prescribe, and would have been delighted to have some book at hand to which he could refer. This little companion exactly supplies this want. It contains a posological table of all the medicines of the British Pharmacopœia, arranged according to their action, is of such a size as to fit the Visiting List and Medical Diaries, and so thin as hardly to add perceptibly to the weight or bulk of the diary.

Clinic of the Month.

Injuries to the Head.—Mr. Jon. Hutchinson, in a clinical lecture on osteitis, necrosis, and pyæmia, points out the dangers of laceration of the scalp, especially if accompanied by detachment of the pericranium. These dangers consist in the occurrence of suppuration between the bone and the internal periosteum, to be followed in its turn by inflammation of the arachnoid membrane; and, secondly, in the choking with coagula and the products of inflammation of the gangrenous veins of the diplöe of the dying fragment, which may extend to the sinuses and cause pyæmia. He states that some of the most typical cases of pyæmia are induced by the death of a very small area of bone. In cases of simple death of the bone, a period of from ten days to a fortnight usually elapses before there are any symptoms of blood disturbance. He arrives at the practical conclusion that in cases in which the propriety of primary trephining is debated, the surgeon may put wholly aside any fears as to increased risk of pymæia after that procedure, and may adopt it or not as the other circumstances of the case may indicate. (*Medical Times and Gazette,* Feb. 27, 1875.)

Diagnosis of Bright's Disease.—Dr. Maclean, of Applecross, observes that Bright's disease may be easily complicated with hæmaturia, and it frequently becomes a question whether the albumen in the urine of a patient is or is not to be explained by the presence of effused blood. We have, in fact, to find out how much blood-albumen the urine contains, and how much albuminuria-albumen. The former can be estimated by counting the number of red blood-corpuscles to be seen on a given extent of the microscopic slide; it being known how much albumen, say, in the ounce of urine shall correspond to a given number of discs. Dr. Maclean finds that when forty blood-discs are to be seen in the whole field of an "Oberhauser" microscope, using object-glass No. 7 and eye-glass No. 4, if there be effused blood in the urine, the albumen contained in an ounce, on being dried, weighs one grain; therefore, whatever there is of dried albumen, from the ounce of urine over and above the proportion of one

grain to the forty blood-discs seen as above, must be the product of true albuminuria. In a case under his own care of granular disease of the kidney, the albumen obtained from one ounce of the urine, independently of blood, weighed eight grains when first examined. He finds that the urine has a distinct tinge of blood when as few as ten discs are to be seen in the field of the microscope. He refers to a case supposed to be of albuminuria, but in which, some time after the attack in which albumen was found abundantly in the urine, he observed crystals of oxalate of lime, and hence concluded that Bright's disease was absent, and that the albuminuria depended upon a concretion of oxalate of lime forming in the kidney. (*British Med. Journal*, Feb. 27.)

Therapeutic Use of the Continuous Galvanic Current.—Dr. T. Clark, of Bristol, records three cases of disease in which recovery was due to the application of the continuous galvanic current. The first was a case of endometritis; the second a case of lipoma; and the third one of prostatorrhœa. In the first case, a partly insulated wire attached to the negative pole was introduced into the cavity of the uterus, the positive pole was connected with a moist sponge and applied over the pelvis for twenty minutes. This was repeated for three days. In the second case, three needles connected with the negative pole of a battery of sixteen cells were passed into the tumour at its circumference, and the circuit completed by a moist sponge attached to the positive pole and placed on the tumour. The application lasted twenty minutes, and was repeated at intervals of a week or fortnight for fifteen times. In the last case, the negative pole was placed in the rectum, and the positive pole a moist sponge on the perinæum, for from five to ten minutes, on twelve occasions. (*Ibid.*)

Foreign Bodies in the Air-passages.—Mr. Annandale gives an account of a case in which a small portion of the backbone of a herring entered the upper part of the larynx of a child 11 months old. The spines were unfortunately directed upwards. Attempts were made to remove it with forceps, but failing, tracheotomy was performed. The result was unfortunately fatal, the child sinking without apparent reason after a few hours. (*Brit. Med. Journal.*)

Diagnosis of Tumours of the Breast.—Mr. Bryant records one or two cases of error in diagnosing diseases of the breast, he had fallen into in a clinical lecture on the subject, and proceeds to divide mammary tumours, excluding acute and inflammatory diseases, into three classes—(1) cancers, (2) adenomas, and (3) cysts. Cancer is a disease of adult life, attacking unmarried

women earlier in life than it does married women, and presents two forms—the general infiltrated, and the tuberous form, the pathological characters of which he describes. Adenoma generally occurs in the breasts of young healthy women during their period of developmental perfection, and frequently during suckling; it grows slowly, and never infiltrates the breast, but pushes it aside. It is encapsuled and usually movable. It is never associated with any secondary glandular enlargement. (*Med. Times and Gazette*, Feb. 27, 1875.)

The same journal contains some clinical studies on congenital syphilis, by Sir John Rose Cormack.

Surgery of the Arteries.—In a course of lectures lately delivered before the Medical Society of London, Mr. Maunder endorses the dictum of Guthrie, that in cases of wound (in the groin, for instance) followed by free hæmorrhage ceasing either spontaneously or by the use of some simple means, no artery is to be tied unless it bleed, provided the safety of the patient can be secured by special means. When, however, bleeding recurs frequently from a wounded artery, the ligature must be applied. Experience has shown that repair can be more certainly expected to occur on the proximal than on the distal side of the ligature on an artery, and consequently when secondary hæmorrhage does arise, to know whence it comes is of the utmost value to the surgeon. Should the blood be arterial and proximal, little else than the application of a ligature higher up the trunk (with a possible repetition of the bleeding or even gangrene of the limb) will suffice to arrest it. But the prognosis will be much more favourable if the blood be of a dark colour (the blood flowing from the distal end is not necessarily venous), when rest and the local application of cold will be effectual. Mr. Maunder records cases which show that at the ages of 19 and 28 the superficial femoral may be suddenly and permanently obstructed without the supervention of gangrene at the extremity of the limb. In cases of wound of artery in which careful compression and bandaging fail and the bleeding is proximal, Mr. Maunder recommends ligature of the main artery, and then the careful application of pressure. He considers it to be desirable to ligature the brachial artery rather than both radial and ulnar, for secondary hæmorrhage from the hand. In malignant disease, when the growth cannot be removed and it is impossible to check bleeding by milder measures, the feeding artery may be ligatured. (*Lancet*, Feb. 27, 1875.)

Puerperal Fevers.—The Gulstonian Lectures of the present year by Dr. R. J. Lee are devoted to the subject of puerperal fever, and in his first lecture Dr. Lee gives a brief historical *résumé* of the opinions that have been held in regard to its

nature, and especially in regard to the theory now daily gaining ground, that there is a particular cause for the several forms of puerperal fever, viz., the existence of a specific poison in the human system, either introduced or self-developed. (*Ibid.*)

Cardiac Weakness a remote consequence of Railway Injuries.—Dr. Peter Hood calls attention to an obscure but important form of disease sometimes consequent on railway accidents in which no definite lesion has been produced, and in which the shock appears to have fallen entirely upon the nervous centres. Mr. Hood gives several cases, and believes that the prominent symptoms observable are diminished motive power in the heart, with extreme languor of the circulation, and a feeble pulse, which in some cases will be intermittent. He refers to the emotional weakness and hysterical symptoms presented by both males and females after some accidents. He thinks the fact must not be overlooked, that the same amount of blood exists in the body after the shock to the nervous system which existed in it before the accident, and which it is the especial action of the heart to transmit through the vessels, but after a shock the cardiac power is impaired; and this leads him to discuss the propriety of bloodletting after accidents of this nature, a proceeding which he is of opinion is prudent. Mr. Hood states that he has been informed that the administration of a wine-glassful of vinegar is the best means of restoring consciousness after an accident due to concussion. The subsequent treatment should consist in cessation from business and change of air, with tonics. Sleep should be ensured by hydrate of chloral, and due attention paid to the bowels. (*Ibid.*)

Etiology of Puerperal Fever.—Dr. Huntley, of Jarrow-on-Tyne, relates his experience of the communication of puerperal fever by the physician. In his case, the outbreak was manifestly associated with himself, as it was exclusively confined to his practice, notwithstanding there were four other practitioners in the town. All precautionary measures were taken to eradicate any contamination, such as baths, changing of clothes, but all to no purpose. He eventually went over to Ireland, and remained there six weeks. Nevertheless, the first two or three cases that he attended showed unmistakable signs of infection, and he was compelled by the serious consequences to cease the practice of this branch of the profession for a further period. He left his practice in charge of a *locum tenens*, and no case of puerperal fever occurred in those he attended. From a careful consideration of all the circumstances, Dr. Huntley thinks that the causes of puerperal fever may be divided into (1) those originating in the patient herself, as general unhealth, giving

rise to inflammation of the uterine and peritoneal structures, or such as spring from intra-uterine causes, putrescence of the infant or of the other contents of the uterus; (2) such as spring from atmospheric influences and give rise under ordinary circumstances to fevers, as scarlatina, typhoid, and typhus; and (3) the form which he was himself the unwilling instrument of propagating, in which the contagious influence is somehow intimately associated with the *person* of the obstetrician, and not with his surface or clothing only. It may be, he thinks, that the toxic influence is not generated in the system of the physician *de novo*, but being received from external sources in the first instance, it becomes propagated by some unknown means. (*British Medical Journal*, Feb. 27.)

Addison's Disease.—This disease has been made the subject of the Croonian Lectures by Dr. Headlam Greenhow, and the first lecture is reported in the *Lancet* for March 6 and 13. He gives an historical account of the disease, showing that isolated cases had been observed by Bright, Kirkes, and Schotte before the publication of Addison's well-known memoir. He then describes the phenomena of the disease, the characteristic symptoms being asthma and cardiac debility, loss of appetite and irritability of the stomach, pain and tenderness in loins and hypochondria, with almost spasmodic rigidity of the abdominal muscles. With all this there is but little wasting, the temperature is below the normal, the urine scanty and of low sp. gr., the bowels confined; the mind unaffected to the last, and death occurring from syncope. He describes, at length, the peculiar discoloration of the skin that constitutes so prominent a symptom of the disease, and the pathological changes in the suprarenal capsules and in the veins. (*Lancet*, March 13, 1875.)

Imperfect Teeth and Zonular Cataract.—Mr. Jonathan Hutchinson is of opinion that imperfect teeth are, as a rule, met with in connection with one form only of the cataract of childhood—that known as the lamellar or zonular form, in which neither the nucleus nor the peripheral part of the lens is opaque; a thin layer of fibres at a greater or less distance from the nucleus and completely surrounding it being alone involved. The condition of teeth met with is different from that presented in congenital syphilis, and is characterised, not in an alteration of their form, but in defective development of the enamel. The first molars may be regarded as test teeth. Such cataracts are often associated with fits in infancy, and Mr. Hutchinson is inclined to attribute the condition of the teeth, but not of the lenses, to the use of mercury. (*British Med. Journal*, March 6, 1875.)

Chemical Statics of the Brain.—Dr. I. Thudichum gives the results of a series of investigations upon the composition of the brain, which he has undertaken on behalf of the Medical Department of the Privy Council for the last three years. He divides the constituents into five classes, viz.: 1. Principles containing the five elements C H N S O = albuminous or sulphurised principles. 2. Principles containing the five elements C H N P O = the group of phosphorised principles—kephalin, nyelin, lecithin. 3. Principles containing four elements, C H N O — cerebrin, kerasin, phrenosin, &c. 4. Principles containing three elements, C H O—cholesterin, fats, and fatty acids. 5. Inorganic principles. (*Lancet*, March 6 and 13, 1875.)

The Clinical Thermopile.—Dr. Clifford Allbutt describes a thermo-electric apparatus he has had constructed, and which he has found useful for clinical research. (*British Med. Journal*, March 6, 1875.)

High Temperature after Injury to Spine.—A case was recorded by Mr. J. W. Teale, of Scarborough, at the Medico-Chirurgical Society, of a young lady who had received an injury to her spine from a fall off a horse, and in whom the temperature rose to the extraordinary height of 122 Fahr. in the axillæ. Care was taken to verify the readings and the accuracy of the thermometers used. The pulse was 100—120, small; the respirations normal, but feeble. The hands, feet, and forehead were frequently icy cold whilst the readings were highest. (*Ibid.*)

Report on the Results of Major Operations.—Mr. George Kirkwood communicates the results of the more important surgical operations performed by Prof. Spence in the course of two years at the Royal Infirmary, Edinburgh. The total number was considerably over 100. Of these, 30 were of the lower extremity, whereof 23 recovered. Of the seven deaths, six followed amputation at the thigh, and one the leg. There were six amputations of the upper extremity, of which only one recovered. Of 23 excisions of various joints, only one died. Great attention was always paid to the improvement of the general condition of the patient prior to the operation, and after it the wound was kept scrupulously clean and carbolic acid solution used. In some remarks appended to the paper by Mr. Spence, he seems to think that special methods of dressing wounds are not of such importance as some suppose. (*Med. Times and Gazette*, March 13.)

Typhoid Fever.—Mr. William Robert Smith, of the Hants County Hospital, gives a clinical lecture on this subject, in which he advocates the use of astringents if the number of stools exceeds two per diem, and employs the chalk mixture

with tincture of catechu, which may be given by the mouth or as an injection. Castor oil is the best purgative when constipation is present. When hæmorrhage from the bowels occurs, gallic acid or turpentine with cold to the abdomen are the best remedies. When delirium occurs, the head should be shaved and ice applied. For sleeplessness, hydrate of chloral is serviceable. Great attention should be paid to the nature and quantity of the food.

Mr. Charles Orton describes a case of typhoid fever arising from sewage emanation. (*Ibid.*)

Extracts from British and Foreign Journals.

Influence of Disulphate of Quinine upon the Intracranial Circulation.—Dr. Hammond first quotes from the post-mortem examinations made in Mélier's experiments with Magendie to the effect that large doses of quinine caused cerebral congestion. He quotes from Gübler a very positive assertion that quinine produces its effects on the brain by causing anæmia, an assertion unbacked by any evidence. Dr. Hammond himself took 10 gr. of sulphate of quinine, and in about an hour comparative ophthalmoscopic examination showed marked congestion of the optic papillæ, and with tinnitus there existed distinct congestion of the tympanic membrane. These signs he considered to be connected with cerebral hyperæmia. To determine this more definitely he applied a cephalo-hæmometer to a trephined opening in a dog's skull; he then injected from 2 to 15 grs. of quinine into the subcutaneous tissue. The invariable effect was found to be a rise of fluid in the tube, even as much as an inch and a half. This increase was developed within an hour after administration, continued for about the same length of time, and then gradually returned to the normal degree. To the influence of minute doses of quinine in arresting headache in anæmic persons the writer points as a therapeutical confirmation of his experimental conclusions. (*The Psychological and Medico-legal Journal*, New York, October 1874.)

Strain and Over-action of the Heart. (By Dr. J. W. Da Costa, Philadelphia; being the third Toner Lecture.)—Omitting cases of rupture of the heart-substance, probably always associated with thinning or degeneration of the walls, Dr. Da Costa mentions the occurrence of ruptures or tears of the cardiac valves, most frequently the aortic or mitral. Such ruptures may, he believes, occur either (1) as the result of some sudden violent muscular exertion or strain, or (2) of a strong mental agitation or emotional shock. He cites two cases of the latter which both ended fatally; one in a girl of 18, and the other in a little girl under 3 years. He next considers functional excitement, *i.e.*,

continued over-action or chronic strain. Under this head he recognises the irritable heart, with frequent, sometimes irregular heart-action, pain and oppression in chest, the systolic sound short, sometimes with a bruit, the second sound accentuated. For this he recommends rest and digitalis, whose action is to increase the force while it lessens the frequency of the heart's contractions. The chief causes he recognises are dietetic irregularities, sexual excesses, prolonged bodily exercise, and abuse of tea, coffee, or tobacco; the last by far the most common. Such functional disturbance may, he thinks, run on to organic change taking the form of dilated hypertrophy. The course or chain of events would seem to be, either diminution of muscular excitability, or derangement of the ganglionic rhythm-regulators of the heart, often doubtless as an effect of reflected impression.

Poisoning by Coffee.—Dr. Turschmann met with a case where a woman took an infusion of nearly half a pound of coffee. Two-and-a-half hours after drinking it she presented the symptoms of delirium, anxiety, difficulty in breathing in an extreme degree, although no pulmonary disease existed; a pulse rapid, full, and strong; cardiac palpitations, diarrhœa with tenesmus, retention of urine, enormous distension of the bladder requiring the use of the catheter. Morphia removed all these symptoms, and on the third day the woman was cured. (*Echo de la Presse Médicale.*)

Poisoning by Cigar-smoking.—Professor Chevallier relates the case of a young man who endeavoured to gain a bet that he could smoke twelve cigars in succession. At the eighth he felt uneasy, with the ninth he had some disturbance of vision and chills, these symptoms being more marked with the tenth. He refused to stop smoking, although he went to his house accompanied by two of his friends. He was there attacked with abdominal pains and vomitings. A physician was called in, but the man died during the night. It should be remarked that the patient was the subject of cardiac hypertrophy. (*Ibid.*)

Jaborandi.—According to Mr. Holmes, Jaborandi is the leaf of a Brazilian plant belonging to the tribe Zanthoxyleæ and genus Pilocarpus. The species is not yet exactly determined, but it is either *Pilocarpus pennatifolius*, or more probably *P. Selloanus*. The leaves of the Jaborandi, like those of many other plants of the Rue tribe, are studded with pellucid dots which are little receptables containing a secretion (*Pharm. Journ.* Nos. 239, 242). When applied to the skin it causes irritation, and when chewed it excites a glowing heat in the tongue like pellitory. The active principle does not seem to be extracted by water, for an infusion of the leaf has a mawkish, bitter taste,

but does not excite the same glowing heat on the tongue that the leaves do, and has but little action, while the Jaborandi from which an infusion has been made retains its pungent taste and is physiologically active (Martindale, *ibid.* 238). The bark has the same action as the leaf (Galippe and Bochefontaine, *Le Progrès Méd.* 1875, No. 7). It first increases and afterwards diminishes the secretions; according to M. Albert Robin (*ibid.* 1874, No. 47) it increases the secretions of the glands connected with the alimentary canal, viz., the saliva and the secretions of the stomach and intestine. It is a sialogogue, and produces vomiting and purging. The vomiting is more frequent when much saliva is swallowed, and the stomach and intestines are hyperæmic and sometimes present small ecchymoses. The lachrymal glands are stimulated and their secretion is greatly increased. The secretion of mucus from the mucous membrane of the nose, trachea, and bronchial tubes is augmented, so that frequent expectoration is induced. It is a most powerful sudorific, and Mr. Martindale found that a large dose of it caused him to perspire so that his night-shirt was soaked, and the sweat passed off in steam from his arm and sleeve. It increases the rapidity of the pulse. The temperature rises slightly before sweating comes on, rises 1 or 2 degrees during the sweating stage, then falls to the normal, and on the next day and day afterwards falls 1 or 2 degrees below it. The amount of urea in the urine is not altered. M. Carville (*ibid.* 1874, No. 49) has found that the salivation produced by Jaborandi continues after division of the tympanico-lingual nerve, and therefore this plant probably causes salivation in the same way as muscarine by acting on the ends of the nerves within the salivary glands themselves, and not on those which pass to them from the brain. The salivation produced by Jaborandi, like that of muscarine, is completely arrested by atropia. M. Vulpian has observed that atropia also greatly diminishes the sudorific action of Jaborandi (*ibid.* 1875, No. 6). According to Galippe and Bochefontaine the infusion of either the bark or the leaf causes dilatation of the pupil. MM. Robin and Gubler have employed Jaborandi in acute rheumatism, and on the next day have noticed a lowering of the temperature and a remarkable diminution of the articular pains, which indeed almost entirely disappeared. In acute bronchitis, especially in emphysematous patients, they have noticed a marked improvement, and the next day the secretion was dried up. In Bright's disease they have observed a rapid but temporary disappearance of œdema from the tissues and of albumen from the urine. As Jaborandi excites the action of the heart, MM. Robin and Gubler, as well as MM. Parrot and Carville, are very cautious in employing it whenever valvular disease is present (*ibid.* 1874, No. 47).

Bromide of Camphor.—This is a product of substitution in which one equivalent of hydrogen in the camphor is replaced by an equivalent of bromine. Beautiful, elongated, colourless crystals have been obtained by Drs. Clin and M. Silva; they have a camphoraceous smell, and a slightly acrid flavour. M. Bourneville, in testing its therapeutical powers on frogs, guinea-pigs, rabbits, and cats, found that it diminishes the number of the beats of the heart, that it causes a gradual diminution of temperature, which proceeds regularly till death takes place, if fatal doses are given; whilst if the dose is insufficient to produce death, the temperature gradually and very slowly rises to the normal; that it possesses undoubted hypnotic powers, and appears to act principally on the cerebral nervous system. Its therapeutical properties have been investigated by several physicians. Thus M. Deneffe, of Ghent, has found it useful in delirium tremens; Dr. Hammond, of New York, in infantile convulsions, protracted hysteria, and in cephalalgia consequent on excessive brain work. In France, M. Bourneville has made numerous experiments with it under M. Charcot's direction in the Hôpital Salpétrière. He found more or less benefit accrue from its employment in chorea, paralysis agitans, insomnia, and dyspnœa. More recently he has tested its value in epilepsy, and in six cases out of eight has observed a notable diminution of the number of the attacks, and a considerable diminution in the frequency and severity of the vertigo. It has also been used with advantage by Dr. Clin in affections of the genito-urinary organs, as in nymphomania and priapism, and in nocturnal incontinence of urine. Advantage has also resulted from its use in cardiac palpitations, nervous cough, asthma, and spasm of the glottis. (*La France Médicale*, No. 95.)

The Milk Treatment in India.—Assistant-surgeon Chand Dute gives the following methods of treating ascites and chronic diarrhœa or dysentery with anasarca, by milk diet, described in Sanscrit medical works and practised by native doctors:—Take of the powder of an old rootstock of *Arum maculatum* eight parts, powdered rice sixteen parts, and boil down with milk and water to a pulpy consistence. This is to be taken as diet during the day in divided doses, the only other article allowed being milk, which may be taken *ad libitum*. Water is prohibited. This plan is said to cure ascites, anasarca, chronic diarrhœa, and jaundice. Chronic dysentery and diarrhœa with anasarca are as a last resort treated by the natives with a preparation of gold and mercury, and also with a milk diet, pill composed of sulphuret of mercury, datura seeds, and opium, the mixture being soaked in the juice of the leaves of a species of vitex. (*Indian Medical Gazette*, vol. ix. No. 8.)

Extirpation of the Parotid Gland.—This remarkable and difficult operation has lately been performed without haemorrhage by Professor Corradi. The gland was affected with carcinoma, and the dissection is stated to have been conducted with great care; the several parotidian and the carotid arteries being tied as they were exposed, and then divided. The separation of the gland from the styloid process, muscles, and deeper lying parts, was effected chiefly by means of a flat metallic spatula, and at certain points the galvano-caustic was employed. (*L'Imparziale,* No. 1, 1875.)

Sulphate of Quinine in Erysipelas.—Dr. Le Mounier, of New Orleans, after referring to Colnheim's investigations on the escape of white corpuscles from the vessels, and to Binz's observations on the action of quinine on their amœboid movements, records a series of cases in which he employed quinine as a remedy with great success, and concludes that if quinine has not the power of checking the march of erysipelas, or of abridging its duration, it certainly seems to be capable of mitigating its symptoms. He gives his patients about two grains every hour or two, and feeds them on the best diet. He agrees with Briquet in finding that if the salt be given in small doses the cerebro-spinal functions are in the first instance excited, whilst if the doses be kept up and increased, a sedative effect is observed. The period of excitement is short, whilst the sedative period is prolonged. In regard to its action on the circulatory system, when given in small doses and at long intervals, it gives energy to the beatings of the heart, increases its force and the frequency of the pulse; but given in large doses and progressively (from 20 to 60 grains in the twenty-four hours), it has a marked sedative effect on the cardio-vascular system, as shown by a marked slowness and weakness in the beatings of the heart and pulse. It also possesses a depressive influence on calorification. (*New Orleans Medical and Surgical Journal,* vol. ii. No. 3.)

Luxatio Penis.—A remarkable case of this injury, of which only one other instance has occurred under Nélaton, has been recorded by Dr. Moldenhauer, of Solingen. The patient fell from a waggon and was otherwise damaged. The penis was forced from its cutaneous investment and concealed in the scrotum. At first sight the case appeared to be one of contusion of the penis, but the introduction of a catheter was found to be impossible, and an opening was made to permit the escape of the urine. At a subsequent period an abscess formed in the groin, which, on being opened, showed the uninjured glans and body of the penis, which had forced its way upwards along the line of Poupart's Ligament. The organ could not be replaced. (*Berlin. Klin. Wochenschrift,* 1874, No. 43.)

Bacteria and Suppuration.—In a communication to the *Centralblatt für Chirurgie*, Dr. Arnold Hiller states he has been led to undertake a series of investigations in order to convince himself or otherwise of the correctness of the observation made by Iebs that "Bacteria excite or are the excitors of suppuration, and that a chemical product of the same constitutes the exciting cause of fever." Dr. Hiller first experimented on *rabbits*, and finds, as is well known, that cutaneous wounds in these animals heal without suppuration under a scab. On making such wounds of the size of a threepenny-piece, and watering night and morning with bacteria, isolated, and floating in distilled water, a piece of gutta-percha being afterwards placed over the wound, the surface was found to be always dry and covered with the adherent masses of bacteria, and suppuration never occurred. The application of a series of other substances, as ammonia, corrosive sublimate, tinctura sinapis, &c., applied in a similar manner, called forth just the amount of inflammation and suppuration that corresponded to their relative strength. *Dogs* in which cutaneous wounds are made, that are then covered with gutta-percha leaf and washed with distilled water daily, present suppuration, at first serous, but, subsequent to the second day, distinctly, but to a moderate degree only. Daily irrigation with the isolated bacteria in distilled water in no way changed the course or intensity of these phenomena, and reparation took place with equal rapidity in both instances. *Frogs* were found to be inappropriate for such experiments, on account of their living in water. In another series of experiments on subcutaneous wounds, Hiller found that healing took place without suppuration, by cicatrisation and regeneration of tissue. The introduction of any irritant caused violent inflammation and suppuration and the formation of an abscess; but when in rabbits, in which such subcutaneous wounds had been made in muscles, tendons, or connective tissue, fluid containing bacteria was injected, or when instruments dipped in a fluid containing a large number of isolated bacteria were applied to the lips of the wound, suppuration never occurred in any one instance. In the wounds of muscles, retardation of healing was observed in proportion to the mobility and exercise of the part, but otherwise no change was produced. In a third series of experiments the pus of healthily granulating wounds was mingled with isolated bacteria, but neither was the creamy character of the pus altered, nor were any indications perceived of violent reaction in the wound itself; neither erysipelas, diphtheria, lymphangitis, or septicæmia. Microscopically, however, it was found that the bacteria had undergone multiplication. In a fourth series of experiments the filtrate of septic fluids, as of decomposing muscle or blood serum, was applied

to fresh wounds. The filtrates contained numerous bacteria, and the general symptoms of putrid infection were produced. In old wounds covered with granulations, no effects occurred in many instances. From these researches Hiller considers himself justified in opposing the doctrines of those whom he euphemistically terms Philomicrococcologues. (*Centralblatt für die Chirurgie*, No. 33, 1875.)

Salicylic Acid.—Dr. Horsford, of Boston, communicates the contents of a letter he has recently received from Prof. Schwartz, of Gratz, giving an account of a meeting of the Scientific Congress at Breslau. In this letter, Prof. Schwartz states that the most important thing in the Chemical Section was the exhibition of the salicylic acid now produced in large quantities by the method of Kolbe. It is made from phenol sodium, into which is conducted dry carbonic acid, at a temperature of 170° C. There is formed a salicylate of soda, which, decomposed by hydrochloric acid, precipitates the salicylic acid. This is the best disinfectant known. It is without odour, tasteless, not poisonous, and even in small quantities absolutely preventing putrefaction. Meat immersed in a solution of salicylic acid in an open vessel remained perfectly sweet for weeks. Fruits do not become mouldy, and wounds heal without festering. It prevents milk from coagulation. In the case of a patient whose leg was amputated, the wound was sprinkled with a little powdered salicylic acid, and bandaged for six days without being touched. It was then found to be healed over without the slightest formation of pus. (*Boston Med. and Surgical Journal*, Jan. 28, 1875.)

Antidote to Carbolic Acid.—Husemann has shown by experiment that the alkalies and earths are the best antidotes to carbolic acid, whilst the fixed oils, glycerine, &c., are inoperative. The best agent he found to be saccharate of lime, obtained by the solution of sixteen parts of sugar in forty parts of water, and the addition of five parts of caustic lime. The mixture should be allowed to digest for three days, with occasional agitation, then filtered and evaporated to dryness. The product is readily soluble in water. (*Der Praktische Arzt*, Jahrg. xv., No. 9.)

Babies' Sore Eyes.—Dr. Williams, of Harvard University, points out the importance of not neglecting even slight cases of Ophthalmia neonatorum, the measures to be adopted consisting essentially of cleanliness with the frequent ablution of the eyes with tepid water and the use of simple ointment along the edges of the lids. Care should be taken, he thinks, not to use any strong astringent lotions. The condition of the

cornea should be watched, and if cloudiness appear, atropine, in the proportion of one or two grains to the ounce, should be used. (*Boston Med. and Surgical Journal*, Jan. 28, 1875.)

Poisonous Action of Arnica on the Skin.—Dr. James C. White calls attention to the irritant action of tincture of arnica when applied to the skin. He records several cases, in all of which acute inflammation followed its application, accompanied by the development of papules, vesicles, excoriation, crusts, and scales in regular sequence. The local symptoms were intense itching and some degree of burning. Hebra seems to have noticed similar symptoms. Its application should, therefore, be made with caution. (*Ibid.*)

Gum-cutting.—Dr. Charles Buckingham, Professor of Obstetrics in Harvard University, pronounces a very decided opinion on this disputed point. He thinks it is in many cases highly serviceable, relieving local pain by permitting the oozing of blood, and assisting obstinate diarrhœa, or constipation, and the signs of diseased brain, such as vomiting, stupor, convulsions, dilated and immovable pupil. (*Ibid.*)

Action of Lobelina on the Circulation.—Lobelina, according to Dr. Ott, of Easton, Pennsylvania, is a dark oily liquid, of considerable consistence, tobacco-like taste and odour, with a specific gravity heavier than that of water. Given in small doses it increases the blood-pressure, apparently by acting as an excitant on the peripheral vaso-motor system. The pulse is temporarily reduced, and then increased. It is mainly a respiratory poison, and in the cat it greatly reduces temperature. (*Ibid.*, Feb 4, 1875.)

The Excretion of Nitrogen in the Urine.—Dr. J. Byrne Power maintains the importance of estimating the total nitrogen in the urine, and describes a mode by which a ratio may be established between it and the amount of nitrogen excreted as urea. It shows that the amount of nitrogen not excreted as urea varies considerably in some instances, being as much as one-sixth of the whole amount, in others being only one-nineteenth part; and this variation, he thinks, may account for the discrepant accounts given by skilled observers of the effects of exercise, diet, &c. (*Dublin Medical Journal*, Feb. 1875.)

The same journal contains an account of a case of excision of the head of the right humerus for caries by Surgeon-Major Porter, and a series of selected cases by Dr. Charles Ball.

Treatment of Uterine Flexions.—Dr. Fr. Eklund, of Stockholm, states that having been lately assiduously occupied in studying the treatment of uterine flexions, and especially of

retroflexions, he has followed the plan suggested by Dr. Amann, of Munich, and has had a stem of vulcanite constructed, varying in length from 4½, 5, 5½, 6, up to 8 centimetres. After the uterus has been redressed by means of the sound, the stem must be introduced in the uterine cavity exactly at the moment that the sound has been withdrawn, as if to *surprise* the uterus. If a retroflexion has to be treated, one blade of Dr. Barnes' speculum is to be introduced, and the blade of the stem by means of the end of the speculum must be held fixed against the posterior vaginal wall (or, in the case of anteversions, against the anterior vaginal wall). Two tampons of cotton-wool, which can be withdrawn by means of linen strings, are then to be introduced to the vaginal roof, and one more is to be placed quite beneath the stem. The tampons are to be soaked in a solution of tannic acid and iron, in glycerine and water, and are to be changed after three days, and before the application of new ones a vaginal injection is to be used. Dr. Eklund's further improvements upon this method are: (1) That the stems are made of zinc, so that a galvanic or faradaic current may be applied through the musculature of the uterus and its ligaments for the purpose of allaying pains, strengthening relaxed tissue, or softening those which are indurated; (2) The zinc of the stems effects a favourable influence on the modified surface of the mucous membrane; and (3) The addition of iron is of the utmost importance as an antiseptic. (*Obstetrical Journal*, No. 21.)

The Remedial Use of Water.—A paper on this subject appears in the *American Practitioner* from the pen of Dr. Austin Flint. He limits his observations to the researches of Currie made towards the close of the last century, and points out that whilst the advocates of the cold water treatment at the present time employ it purely to obtain an antipyretic effect, the sole purpose being the withdrawal of heat from the body, Currie evidently did not regard its remedial use exclusively in this light; he considered the sudden and powerful impression upon the nervous system as especially important, and hence the choice of affusion as the mode of treatment. Currie appears to have obtained the idea from Dr. William Wright, and to have had clear ideas of the value of the thermometer in disease. (*American Practitioner*, Jan. 1875.)

Fracture of Patella.—Dr. Beach gives an account of a new splint he improvised for a case that fell under his care, and which answered well: essentially it consists of a block passing under the ham, with two uprights on each side of the limb, connected above and below the patella by a piece of curved metal. The arches can be approximated by a couple of straps, and pressure can thus be exerted against the fragments, forcing

them into and retaining them in position. (*St. Louis Medical Journal*, Jan. 1875.)

The American Journal of Insanity for October 1874, vol. xxxi. No. 11, contains a long report of the Proceedings of the Association of Medical Superintendents; also, two papers bearing on the subject of simulated insanity, one by Dr. Ray, and the other by Dr. Hughes. Dr. Huger has a paper on Psychological Medicine considered as a specialty.

Notes and Queries.

CORRESPONDENCE.

Copaiba as an Application to Callous Ulcers.—Dr. Frederick J. Brown, of Rochester, informs us that an excellent detergent application to old, callous, fetid ulcers of the leg is the balsam of copaiba, with equal parts of castor oil and glycerine of carbolic acid.

Electricity in Chorea.—Dr. Poore writes:—"From a short abstract of a lecture of mine on 'The Employment of Electricity in Spasmodic Diseases,' which is in the issue of your journal for March, the reader might be led to infer that I advocate electricity in the treatment of chorea. This does not represent my real view, although I admit that the expression used in the original lecture was perhaps capable of this construction. I have never found it necessary to use electricity for treating chorea, and although I have made some experiments, I have never been able to control the clonic spasms of that disease by any form of current. I believe, however, that the 'taking of sparks from the back,' as described in the Guy's Hospital Reports for 1837-41-52, was a decided advance on the heroic treatment then in vogue, and was of great and undoubted service to the patients by replacing what must have been harmful by that which at least did no mischief, if it did no good."

CORRESPONDENCE ON PUBLIC HEALTH.

Mr. Gay informs us that he has read with interest the remarks on "Hospitals for Contagious Diseases," with which, in the main, he entirely concurs. It appears to him, however, that stress has not, generally in articles on this subject, been laid upon the evil of *large* hospitals for these diseases. This view has been gaining ground now for more than a century, and appears to have been shown to be well founded by recent experience. Dr. Parkes, in his work on Military Hospitals and Huts, Miss Nightingale, and others have shown incontestably that in these hospitals, capable of containing hundreds of patients, it is impossible to ensure sufficient ventilation to render the poisonous emanations from the patients *inert;* whilst this can be done with ease in small or cottage hospitals. The danger of infection does not appear to depend upon unconditional contact with an infected person or ward, but upon contact with such a person, or breathing the air of such ward, whilst the poison is in a state of infectious intensification.

It is thus that inhabitants in the vicinity of these hospitals, having no personal contact or communication with the fever patients or wards, are comparatively safe, whilst a patient or visitor from the ward of such an hospital will infect the first person, habitation, or vehicle he reaches, provided he carries the poison with him in a state of adequate intensity. Hence it is clear that the best means of meeting the wants of poor fever patients is to find *small* or *cottage hospitals* for them, say capable each of containing twenty or twenty-five patients, and situated in moderately open spaces (if they can be got) in each parish, and in sufficient number for its necessities.

If large hospitals be chosen, they certainly ought not to be near human habitations, railway stations, cab stands, or large public thoroughfares.

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. Any of the foreign works may be procured on application to Messrs. Dulau, of Soho Square, W.C.; Williams and Norgate, of Henrietta Street, Covent Garden, W.C.; or Baillière, of King William Street, Charing Cross.

Department of Public Health.

THE ARITHMETIC OF EPIDEMIC PROGRESSION.

At the meeting of the Epidemiological Society on Wednesday, March 10, a highly suggestive paper was read by Dr. George Evans, on some arithmetical questions connected with the rise and progress of epidemics. He commenced by stating that his investigations had been suggested by some calculations made by Dr. Farr in the beginning of 1866, of the probable course of the cattle plague. Dr. Farr had shown that the real law of this epidemic implied that the ratio of increase went on rapidly decreasing, until the ratio itself was a decreasing one. Applying the law of gradually decreasing increase obtained from the earlier weeks of the epidemic, he calculated its probable course, which very nearly resembled its actual course. Dr. Evans thought it would be interesting to ascertain if this method could be applied to other epidemics, and whether we could at any early part of their course predicate the period of their culmination and the rate of their decline; he therefore investigated some epidemics of which the progress is known, with this view. Dr. Evans described in the following terms the process of calculation employed by Dr. Farr.

Take nine weeks of the early course of the epidemic, in three groups of three weeks each: find the average deaths per week in each group: find the number by which you must multiply the first average to obtain the second, and the numbers by which you must multiply the second average to obtain the third: or, as simpler process, take the difference between the logarithms of the first and second averages, and between the logarithms of the second and third. The first of these differences may be called

δ^1, and the difference between these two differences, which should, to bear out this theory, be a negative quantity, may be called δ^2. We have now the data for constructing the series. The average of the first three weeks is the starting-point, and represents the centre week of those three. The next number in the series is obtained by adding to the logarithm of our first number a number composed of $\frac{\delta^1}{3} - \frac{\delta^2}{9}$, remembering that δ^2 is a negative quantity; we continue to add to the logarithm for each place in the series a number gradually diminished by the addition in each place of $\frac{\delta^2}{9}$: after a time the number to be added becomes negative, and the series gradually diminishes.

Having shown that this method of calculation could only produce a satisfactory result when an epidemic is increasing with a gradually decreasing ratio of increase, Dr. Evans proceeded to the instances in which he had applied the method, premising that he had selected such epidemics as were least likely to be affected by sanitary measures. Taking first the cattle plague, he showed that a calculation based upon data obtained from nine weeks ending Dec. 30, 1865, produced a curve for the epidemic which reached its acme in the second week of February, and then gradually declined, its acme being within one week of that in which the greatest number of attacks were reported; the real decline of the epidemic was more rapid than the calculated decline, a result very reasonably attributed by Dr. Farr to the effect of slaughtering in the latter weeks of the epidemic. He remarked that the calculation would not be satisfactory if it included the week ending Oct. 28th (the first week of reported attacks), as in that case the calculated series would have gone on increasing indefinitely; and that if the calculation had commenced with the week ending Nov. 11th (instead of with the week ending Nov. 4th), a very different curve would have been obtained, very little resembling the real course of the epidemic.

In the case of the cholera deaths in London in 1849, a curve obtained by using the 2nd to 10th weeks inclusive was by no means like the actual course of the epidemic. The first week could not be used in the calculation, as a constantly increasing series would have been the result.

In the case of the cholera deaths in London in 1854, the calculated series very nearly resembled the real course, but the first nine weeks of the epidemic from which the data were obtained, included the acme of the epidemic.

Dr. Evans next proceeded to take in detail the scarlet fever epidemics in London during the years 1840–71 and in 1874. In these, as in the previous cases, each epidemic was represented diagrammatically on a chart, with the calculated series beside it.

In 1848, the fever appeared to become epidemic about the 21st week of the year, but no satisfactory calculation could be based on any series of weeks earlier than that commencing with the 28th: using the nine weeks from the 28th to 36th, or those from the 32nd to the 40th, a curve in either case was obtained which fairly represented the subsequent course of the epidemic.

In 1854, though the fever appeared from the chart to be epidemic about the 12th or 13th week, any calculation would have indicated a constantly increasing epidemic, till the nine weeks from the 35th to the 43rd were used, the latter being very near the apex of the curve. Here the calculated curve singularly resembled the actual decline of the epidemic.

In 1858, two calculations based upon the weeks from the 29th to the 37th, and from the 30th to the 38th, gave two curves rather similar, of which the latter very closely resembled the actual course of the epidemic, the highest death-rates being in the 41st and 47th weeks.

In 1869, a calculation based on the first nine weeks of rapid rise of death-rate very fairly represented the course of the epidemic, as also did one based on a series of nine weeks commencing three weeks later.

In 1874, the death-rate, very low in the first 21 weeks, then steadily increased up to the 43rd. On trying to calculate its course, if the first nine weeks were used, beginning with the 22nd, an indefinitely ascending series was obtained; on commencing with the 20th, 24th, or 25th, a similar result occurred: with the 26th a very short series was obtained, not resembling the actual course of the epidemic; and it was not till the nine weeks commencing with the 28th are used, that the probable course of the epidemic could be calculated. The curve then obtained was very like the actual course taken.

From these observations Dr. Evans concluded that in those cases where the above method produces a curve resembling that taken by the epidemic, it is difficult to ascertain exactly at what period of the epidemic the data are to be obtained: that there is evidence that in the case of many epidemics this process accurately represents the probable course, if applied at the right period; but that its practical value is very much lessened by the fact that at present it is difficult to ascertain what the indications are that an epidemic has arrived at that part of its course which fairly foreshadows the rest of it.

SANITARY MATTERS IN PARLIAMENT.

When Mr. Lowe sarcastically capped the *Sanitas sanitatum* of the Prime Minister with the *Vanitas vanitatum* of a wiser preacher, he had a clearer apprehension of the worth of the apothegm uttered from the hustings than those persons who regarded it as the earnest of a long-deferred sanitary millennium. We must needs now confess, notwithstanding our hopefulness a month ago as to the dawn of a new sanitary epoch (*Practitioner*, March 1875), that the action of the Government with regard to the different Sanitary Bills at present before Parliament is not such as to argue any clearly defined policy of sanitary legislation and administration. Three Bills are now before Parliament, each designed in a particular way to promote a common object, namely, the sanitary welfare of the people, but each in principle inconsistent with the others, and each dealt with as if the Minister responsible for it had no closer relations with his fellow Ministers and with the head of the Government than a private member of the Legislature. The three Bills in question are the Artisans' Dwellings Bill, the Adulteration of Food and Drugs Bill, and the Public Health Bill. The first of these Bills, introduced by the Home Secretary, Mr. Cross, is devised solely for sanitary purposes in the truest sense of the word, as we had occasion to show last month. "We proceed entirely on sanitary grounds," Mr. Cross said, when he brought the Bill before the House of

Commons. "We don't wish them (the urban sanitary authorities) to make street improvements for their own glorification. It is only sanitary purposes we have in view—therefore we think the Act should be put in motion by the medical officers," &c. The second of the Bills, introduced by the President of the Local Government Board, Mr. Sclater-Booth, proceeds from an entirely opposite point of view. While professedly a Bill intended to compass the prevention of adulteration of food and drugs, and thus protect the public against injury from such adulteration, it is in reality a Bill for enabling the wholesale and retail dealer in food and drugs to escape from the legal consequences of the very acts which the Bill is presumed to condemn. The third of the Bills, also introduced by the President of the Local Government Board, while seeking to consolidate existing Sanitary Acts, seeks also to consolidate the maladministration of the Board, by giving it power to over-ride the Local Sanitary Authorities in one of their most important appointments, that of the medical officer of health. In other words, it sets aside, in this respect, the principle of local self-government, which hitherto has been held by the two Presidents of the Local Government Board as the essence of a sound sanitary administration. No doubt political and administrative expediency has to be considered by responsible Ministers, in preparing Bills; but an expediency which admits of aim and object being properly regarded in one Bill but set aside virtually in another, and which in a third Bill seeks compulsorily to regulate by the central authority a most important responsibility of local health administration, can hardly fail in the end to become mischievous.

The Artisans' Dwellings Improvement Bill has for object to give to urban districts having a population of 25,000 or upward, powers, such as have been exercised by a few large towns only under local Acts, for purchasing compulsorily and improving unwholesome areas by the removal or otherwise dealing with the houses and streets thereof. The authority may let or sell, or, if approved by the central authority, may itself make use of the area so acquired, subject to a prepared scheme of reconstruction or re-arrangement, which scheme must provide for the suitable housing of as many of the working class as may have been displaced by the destruction of houses. The Bill appears to be

well calculated to promote the important objects it aims at, and from the reception it has met with in the House of Commons there can be little doubt that it will pass the Legislature substantially unaltered.

The Adulteration of Food and Drugs Bill is a remarkable production. It provides for the repeal of the Adulteration of Food Acts, and proposes to substitute for those Acts the present Bill, under the designation of the "Sale of Food and Drugs Act 1875." The most notable feature of this Bill is that it prohibits the mixing of injurious ingredients and otherwise tampering with food and drugs, hitherto known as adulterations, and also the sale of these sophisticated articles, if the mixing or selling of them be *knowingly* effected. It permits also such mixing or otherwise tampering if it be ratified by "the usage of the trade." Legal skill is hardly needed to comprehend how the requirement that to constitute an offence of the class in question under the Bill it must be *knowingly* committed, and the proposed legalisation of "the usages of trade" which obtain in food and drugs, must render the Bill futile. At a recent meeting of the Association of Municipal Corporations, Sir Joseph Heron, the town clerk of Manchester, speaking of this Bill, observed:—

"By this measure, as at present framed, it would be impossible to get at any dealer, because it provided that he was to be 'knowingly' guilty of selling adulterated articles, and he would swear till black in the face that he never knew of the existence of adulterants in the things sold. It was not unreasonable to ask why the public should be put to the expense of keeping up a staff of inspectors and analysts if the law was to step in and provide any number of excuses for what was nothing but a fraud upon the buyer. The first thing that Corporations ought to do if the Bill were to be brought in and carried as framed at present, was to dismiss their analysts, because their services would be rendered utterly useless. He had no doubt that the amendments already proposed in the House of Commons would be adopted. He thought, however, that they ought to take steps to mark their disapproval of the measure, for if it were carried it would render the provisions of the Adulteration Act entirely inoperative and useless." It was thereupon moved by Mr. Alderman Biggs and seconded by the Mayor of Nottingham, and carried

unanimously, 'That the Bill as introduced is very unsatisfactory, and that it be referred to a committee to take such steps as may appear to them desirable, either in support of the notices of amendment given or otherwise, to render the Bill more practicable and agreeable."

The Public Health Bill has for detailed title, "A Bill for Consolidating and Amending the Acts relating to Public Health in England." The Bill consists of 333 clauses, and it is almost wholly devoted to a consolidation of the existing Sanitary Acts, the amendments being very few in number. The Bill is divided into eleven parts, arranged as follows :—1. Preliminary ; 2. Authorities for execution of Act ; 3. Sanitary Provisions ; 4. Local Government Provisions ; 5. General Provisions; 6. Rating and Borrowing Powers, &c. ; 7. Legal Proceedings ; 8. Alteration of Areas and Union of Districts ; 9. Local Government Board ; 10. Miscellaneous and Temporary Provisions ; 11. Saving Clauses and Repeal of Acts. Under these different headings the provisions of the various Sanitary Acts are all classified. The practical advantages of this arrangement, and the relief it would afford to the bewildering confusion of the existing Sanitary Acts, must be obvious. As a work of consolidation, as far as we can judge, the Bill appears to be admirable.

Two of the amendments are of peculiar importance. According to existing law a sanitary authority cannot compel a proper supply of water to a house unless it can be furnished at a rate not exceeding *twopence* a week. Sec. 57 of the present Bill would enable the Local Government Board, on the application of the local authority, where the before-mentioned rate is insufficient, to determine such other rate as under all the circumstances of the case may be reasonable. The second amendment referred to relates to the union of districts for the appointment of a medical officer of health. Sec. 278 would enable the Local Government Board to unite districts for this purpose, and make regulations with respect to their administration ; and also to appoint the poor-law medical officer as an assistant to the officer appointed for united districts. Such a provision would permit the Local Government Board to remove some of the more glaring anomalies of existing appointments ; but, having regard to the lack of judgment hitherto displayed by the Board with regard to

these appointments, it may be questioned whether it is desirable to give it this power without some preliminary inquiry. That it should be requisite thus early to ask for this power is a significant confession of the failure of Mr. Stansfeld's sanitary policy in these appointments.

THE OFFICIAL REPORT ON ENTERIC FEVER AT OVER DARWEN.

THE different reports which have hitherto been made public on the recent outbreak of enteric fever at Over Darwen have failed to convey, as clearly as is to be desired, accurate knowledge of the conditions under which this outbreak occurred. The medical report on the outbreak made to the Local Government Board by Dr. Stevens has now appeared, and it furnishes a complete account of the circumstances which determined the outbreak. This report has that excellent quality of thoroughness which is so striking a characteristic of the work of the inspectors of the medical department of the Local Government Board, and it is deeply to be regretted that the mode of publication ordinarily adopted by the Board prevents their reports being easily accessible to medical officers of health.

Over Darwen is a town lying in a valley, on a gravelly subsoil, among the Lancashire uplands, and it consisted at the last census of 4,225 houses, in which lived 21,273 persons. It draws its water supply from a rivulet two miles away from the town, and under conditions where there is no reason, except that of careless indifference, why the water should not be fairly good and pure. In reality, various impurities find (or until very lately found) their way into the water from farmyards, cesspools, and other sources, in the township of Tockholes and elsewhere. The sewerage of the town is imperfect and insufficient (many streets are wholly undrained), and the arrangements for excrement and refuse disposal would appear to be almost unique in filthiness even among the many filthy arrangements of some northern towns. The excrement, as a rule, is accumulated in cesspools,

of which the possibilities of being cleansed may be estimated from the following statement made by Dr. Stevens of the local official arrangements for scavengers:—"My informer stated that it was the practice to empty three cesspools each night—that is, when they knew of any neighbouring farmer who would take the contents—and they carted the excrement in a semi-fluid state, and so poured it out on to the fields. Some farmers paid for the manure, and they were served first; some would only consent to take it without paying for it, and it often happened that no recipient could be found. Then no cesspool-emptying took place."

It is not surprising that, the scavengering arrangements being after this fashion, Dr. Stevens finds it most convenient to speak of the filth in and about the place as in acres.

The unwholesomeness of Over Darwen has long been notorious and has more than once been the subject of official inquiry; and twice within the last twenty years (in 1861 and 1874) has enteric fever become suddenly and very fatally prevalent in the town. The history of the recent outbreak and of its source we give in Dr. Stevens's own words, without comment.

"In the first few days of October in the present year, medical practitioners observed an unusual number of fever cases coming under treatment; and within a fortnight or three weeks of the outbreak it was computed that some 1,500 cases of the disease were under treatment at the same time. One of the practitioners alone estimated the number on his lists at 600. It is important to observe, that all parts of the town have been infected—high and low, rich and poor. People living in the immediate neighbourhood of accumulated filth, and those inhabiting higher and apparently healthier situations, have alike succumbed to the virulence of the poison.

"In the present year no death from fever was registered between July 4th (when a very rapid death from fever is recorded) to October 8th. This was the first death in the present epidemic; and, since October 8th, the mortality has rapidly increased, the deaths by fever in successive weeks having been 2, 8, 13, 21; in November, 24, 18, 6, 5; and in the two weeks ending on the 12th of the present month, 5 and 6; since then, up to the 16th, there has been only one other death by this cause.

"The sudden and well-nigh universal distribution of the disease has pointed to some fresh and exceptionally widely-operating condition as its cause; a condition affecting, in common, people living in all parts of the town, and variously circumstanced in regard of the local filth conditions that at ordinary times operate in the production of fever. In the course of this inquiry there soon appeared reason for suspecting that this exceptional and common cause would be found in a special contamination of the general water-supply; and on investigation this appeared conclusively to have been the case.

"On the 11th September, a young lady, suffering from fever, was brought to Darwen, to a house on the hill-side overlooking the town. She died there on 12 h October. It appears to have been from this one case that the great outbreak took its rise. The house is situated close to the sough by which the water for the town supply is conveyed into the service lodge. The excreta from this patient had been carried away by a water-closet, the drain from which discharged on to a meadow in front of the house, and passed in its course immediately over, and within two feet of the sough carrying the town water. The father of the deceased expressed himself as tolerably assured that no contamination of the water could have arisen by means of the drain in question, more particularly as the Water Company had some years since examined the drain channel here, and done what they considered necessary in order to secure the water against accidental pollution from this source.

"On examination of this drain it was found to consist of a stone sough, leading from the front of the house to the other side of the road, whence it was continued by some earthen drain-pipes a few feet down a bank, and then onwards under a foot-way by means of an iron pipe, the end of which furthest from the house was left open so that the sewage might flow out over the sloping meadow, stretching thence to the houses below. The part of this drain from the commencement of the iron terminal pipe is in relation with the public water-supply sough. On removing the earth above and around this portion of the drain, it appeared to have been fairly well laid, and between the iron pipe and the water sough some excellent puddling had been used, probably the work of the Water Company on the occasion of their inspection above referred to. This puddling, however, was confined to the space between the iron drain-pipe and the water sough. Further examination of the iron pipe showed it to be almost absolutely choked up, no fluid running through it except as the result of considerable pressure, and on similar examination of the earthen drain-pipes, they, too, were found to give little or no passage to sewage. This had evidently been the case for some time, and the sewage had found a way for itself outside and underneath the drain. Here the sewage had met the water sough, against which it had formed a kind of small cesspool, which was found to contain a quantity of black sewage matter. This matter, containing, be it remembered, the specifically diseased excrement of enteric fever, had, during the latter half of September, gained access to the interior of the water sough through faults in its imperfectly secured joints, and was, with the water, delivered to the houses of the town."[1]

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[1] "It is noteworthy that the previous sudden outbreak of enteric fever in 1861 appears to have been brought about by some similar pollution of the public water supply. The disease was in that year traced from Withnell, a hamlet some four miles from Darwen, to Ryals Farm and the new village of Tockholes, and it was almost immediately after its appearance in Tockholes that the outbreak occurred in all parts of the town of Darwen. It has been before stated that the drainage of this very place, Tockholes, used habitually to run into the town's water."

CAMERON, GRIMSHAW, REYNOLDS, ETC., ON HYGIENE.[1]

THE two works noted below have been prepared with special reference to the requirements of the various sanitary officers created under the Public Health (Ireland) Act 1874. Ireland, thanks to the nature of its poor-law organisation, and to the fact of its having been able to profit by observing the administrative blunders committed in the initiation of the Public Health (England) Act 1872, has been able to avoid the lamentable anomalies in the appointment of medical officers of health and other sanitary officers which have been perpetrated this side St. George's Channel. Ireland starts fairly in her new sanitary organisation with a definitely considered scheme of appointments of local sanitary officers, and this scheme, in principle, our Local Government Board here is now lamely seeking to follow, and has asked Parliament, in the Public Health Bill at present under consideration of the House of Commons, to give it coercive powers for the purpose.

The "Manual" of Professor Cameron is a compact treatise on the principles and practice of public and private hygiene; the "Manual" of Dr. Grimshaw and his coadjutors is a compendious digest of the same subjects. The latter, in fact, should be regarded as the complement of the former, the larger manual being adapted for the library table, the smaller manual being fitted for the pocket.

Professor Cameron begins his work with an introductory chapter on sanitary legislation in Ireland, and then he discusses the duties of sanitary authorities and officers of health, with suggestions as to the mode of performance of their duties by

[1] *A Manual of Hygiene, Public and Private, and Compendium of Sanitary Laws.* By Charles A. Cameron, Ph.D., M.D., Professor of Hygiene, Royal College of Surgeons, Ireland, Medical Officer of Health for Dublin. 8vo., pp. 475. Dublin: Hodges and Co. London: Baillière.

Manual of Public Health for Ireland. By T. W. Grimshaw, M.A., M.D.; J. Emerson Reynolds, F.C.S.; Robert O'B. Furlong, M.A., Barrister-at-law; and J. W. Moore, M.D. Sm. 8vo., pp. 336. Dublin: Fannin and Co.

various sanitary officers. He then, in a series of twenty-four chapters, discusses the various subjects relating to hygiene, and finally, in an appendix, gives the sanitary statutes applicable to Ireland, with notes and an index to them; also an index to the whole work. The conception and arrangement of the work is excellent, and the addition of the sanitary statutes is especially to be commended. It is necessary that the medical officer of health should be as familiar with his duties from the statutory as from the hygienic point of view, and the acquisition of this two-fold knowledge is certainly best promoted by an arrangement such as that which Professor Cameron has adopted. The multifarious subjects which enter into a work on hygiene prevent systematic examination of their treatment by a reviewer where space, as in our case, is very limited. Of the work generally we would say, however, that there is to our thinking a considerable defect which we shall hope to see remedied in another edition. Professor Cameron writes as if he distrusted his own judgment. His chapters are too often overloaded with promiscuous opinions of incidental writers, to the exclusion, in many cases, of the standard authorities and data on the subject. Take, for example, the observations on death-rate as affected by birth-rate (p. 39). Professor Cameron cites Dr. Letheby and Mr. Watt, but says not a word of the official statements of Dr. Farr, statements which it is essential should be mastered if any adequate knowledge of the subject is to be obtained. Again, in the chapter on vaccination and re-vaccination, the unique data upon which the English principles and practice of public vaccination are founded, and the various instructional memoranda for public use in which these are detailed, are (with the exception of the instructions for vaccinators under contract) ignored, while place is given to not a few crude and imperfect opinions on the subject. Still again, on the important practical question of the riddance of excreta, he gives us various odds and ends of information, but no result of his own digested opinion to guide the medical officer of health in his difficulties. He certainly quotes the conclusion of the Buchanan-Radcliffe report on the subject, but he withholds the description of the "midden-closet," which they think to have fewest objections, and which surely would be a valuable bit of knowledge in Ireland. Certainly he appends a plate of a midden-

closet adopted in Hull, but whether this be the typical midden-closet or not, there is not a word to state. We beg of Professor Cameron, in the next edition of this work, to make a good treatise better by discarding indiscriminate jottings, and giving us his own matured opinions.

The "Manual" of Dr. Grimshaw and his coadjutors (which, by the way, has been edited by Dr. John William Moore) gives in the first four chapters a careful description of the Public Health (Ireland) Act 1874, of the duties of sanitary officers, a list of the statutes relating to public health in Ireland, and an excellent index to the Sanitary Acts. Then follows a summary statement of the various questions relating to vital statistics, population, and the development of man, which it is incumbent upon medical officers of health to master; and afterwards preventible and controllable diseases and the different subjects entering into hygiene are concisely treated of. The work is a marvel of compendiousness, and rarely has clearness been sacrificed to conciseness. The chapter on sewage and its treatment is, however, markedly insufficient. We have no reason to suppose that this question is less important in Ireland than in England, and we were under the impression that methods of removal of excremental matters by cartage were as much a need of numerous Irish towns and villages as they are of numerous English towns and villages. Yet the valuable experience of many English towns and villages on the systematisation of methods by cartage is not even referred to in the chapter.

INDEX.

INDEX TO VOL. XIV.

A.

Abscess of the cornea, treatment of, Dr. Osio, 59
Aconite and opium, action of, Dr. Ellis Blake, 462
Ademollo, Dr., Nocturnal Enuresis cured by hydrate of chloral, 430
Addison's disease, Dr. Headlam Greenhow, 292
Ague, emetics in cold stage of, 138
Air-passages, foreign bodies in, Mr. Annandale, 289
Alcohol in fever, researches on the action of, Dr. G. Strassburgh, 136; and energy, Dr. Douglas Martin, 210
Allbutt, Dr. Clifford, clinical thermopile, 293
"American Journal of Insanity" for October 1874. Contents, 304
Anæsthesia, condition of the pupil in MM. Brodin and Coyne, 455
Anderson, Dr. M'Call, practical treatise on "Eczema, including its lichenous and impetiginous forms," 123
Anæmia, essential or pernicious, use of phosphorus in, 16; case of, 22; their relation to Addison's disease, 22
Aneurism, surgical treatment of, Mr. Holmes, 447
Angina, therapeutic uses of phosphorus in, 16
Anginoid pain, accompanying aortic, regurgitant disease, treatment of, 17; pain in left side, treatment of, 19
Annandale, Mr., air-passages in foreign bodies, 289
Aphonia treated by faradisation, Dr. Porter, 58
Argyriasis from local application of nitrate of silver, Dr. Dugnet, 462
Arnica, poisonous action on the skin, Dr. J. C. White, 302
Arsenic and antimony, on the entrance of, into the tissues and fluids of the body, MM. Mayençon and Bergeret, 133
Arteries, surgery of the, Mr. Maunders, 290, 363
Asarum Canadense, action of, Dr. P. R. Palm, 218
Ascites, cirrhosis jecoris (first stage,) 81
Atropia and veratria in incontinence of urine, Dr. Thomas Kennard, 366
Aural irritation, cough from, Dr. Clelands, 130

B.

Babies' sore eyes, Dr. Williams, 301
Bachelder, Dr., Mammillitis, 456
Bacteria and suppuration, Dr. Arnold Hiller, 300; in subcutaneous effusions, Dr. Nepveu, 453
Balsam copaibæ, therapeutic value of, A. R. Hall, 241
Barnes, Dr. R., affections of the bladder in relation to ovarian, &c., 449
Bartley, Dr. Robert T. H., "Pharmacopœial Companion to Visiting List," &c., 287
Basham, Dr. W. R., calculous disease of the kidneys, renal abscess, calculous pyelitis, 28; tubercular or scrofulous disease of kidneys, 422
Bastian, Dr. Charlton, Germ Theory of Disease, 360
"Baths and Waters, curative effects," Dr. Julius Braun, 281
Beach, Dr., splint for fracture of the patella, 303
Beale, Dr. Lionel, vital action in life and disease, 361
Becker, Dr. Otto, transplantation of the conjunctiva of the rabbit into the conjunctival sac of man, 367

Bellini, Signor, iodide of starch in medicine, 460
Bergeret, M., on the entrance of arsenic and antimony into the tissues and fluids of the body, 133
Bettelheim, Dr. Karl, treatment of ulcer of the stomach, 61
Bigelow, H. J., true neck of the femur, its structure and pathology, 217
Bladder, the, observations on by Budge, 42; Goltz, 44; Wermich, 45; Oppolzer, 45; Clarus, 45; affections of in relation to ovarian, Dr. R. Barnes, 449
Blake, Dr. Ellis, action of aconite and opium, 462
Blanc, Dr. Henry, cold water and antiseptic treatment of typhoid fever, 209
Bone, transplantation of, Prof. Nussbaum, 459
Börck, Dr. E., bronchocele, 457
Brain, chemical statics, Dr. I. Thudichum, 293
Braum, Dr. Julius, "Curative Effects of Baths and Waters," 281
Bredin and Coyne, MM., condition of the pupil in anæsthesia, 455
Bright's disease, treatment of, Dr. Lecorché, 60; diagnosis of, Dr. Maclean, 288
Broadbent, Dr. W. H., further illustrations of the therapeutic uses of phosphorus: in angina, essential or pernicious anæmia, leucocythæmia, 16; on the physiology of the act of vomiting, 100
Bronchocele, treatment of, Dr. Gibb, 206; Dr. E. Börck, 457
Brown, Dr. F. J., copaiba as an application to callous ulcers, 305
Browne, J. Crichton, M.D., F.R.S.F., "West Riding Lunatic Asylum Reports," vol. iv., 199; action of picrotoxine and the antagonism between it and chloral hydrate, 361
Brumbaugh, Dr., effect of tobacco on nervous system, 218
Bryant, Mr., conservative surgery, 206; diagnosis of tumours of the breast, 289
Buchanan, Dr., death rates, 237
Buckingham, Dr. C., gum-cutting, 302
Budge, experiments on bladder, description of, 42
Bufalini, Prof., death of, 465
Burdon-Sanderson, Dr. J., the occurrence of organic forms in connection with contagious and infectious diseases, 205; specific contagia as a cause of disease, 360
Byrne, Dr. J., excretion of nitrogen in the urine, 302

C.

Carter, R. Brudenell, F.R.C.S., on the examination of patients suffering from eye disease, 46, 103, 250
Carbolic acid, antidote to, Husemann, 301; in vomiting of pregnancy, 450
Cardiac weakness, a consequence of railway injuries, Dr. Peter Hood, 291
Carpenter, Dr. Alfred, rational treatment of some forms of hemiplegia, 321
Carroce, Dr. A. L., a case of enteric fever, 332
Castor oil, administration of, M. Potain, 135; for chronic diarrhœa, 164
Cataract, zonular, 292
Cameron, C. A., Ph. D., M.D., "Manual of Hygiene, Public and Private," &c., 318
Camphor, monobromide of, Robert Lawson, M.B., 262; use of bromide of, 298
Callender, Geo. W., F.R.S., on the treatment of fracture of the patella, 186
Cancerous ulcerations of the uterus, local use of liquor ferri perchloridi fortior in, 131
Charpentier, Dr., placenta prævia, 454
Chambers, Dr. T. King, F.R.C.P., "Manual of Diet in Health and Disease," 443
Chemical Society Journal, 122
Chest and throat disease among the poor, 466
Chevallier, Prof., poisoning by cigar smoking, 296
Charteris, Dr., strychnia poisoning, recovery by hydrate of chloral, 363
Chinchonidine, sulphate of, Surgeon-Major G. Hunter, 448
Chloral suppositories, M. Paul, 464
Chlorate of potassium, best method of using, topically, Prof. Gosselin, 367
Chouppe, M., action of the most common emetics, 368
Chorea, electricity in, Dr. Poore, 305
Cigar smoking, poisoning by, Prof. Chevallier, 296
Clark, Dr. T., therapeutic use of galvanic current, 289
Clarke, Dr. H. B., infantile convulsions, 208
Cleland, Dr., cough from aural irritation, 130; removal of foreign bodies from the ear, 131
Clemens, Dr., liniment for scabies, 153
Clinical thermopile, Dr. Clifford All-

buff, 293; "Clinical Pocket Book," 446
Coates, Dr., disease of the vermiform appendix, with fatal issue, 129
Coffee, poisoning by, Dr. Turschmann, 296
Cold, use of in typhoid fever, 12, 13
Colonist's medicine chest, 465
Congestion papilla in intracranial disease, Dr. Swanzy, 453
Conjunctiva of the rabbit transplanted into the conjunctival sac of man, Dr. Otto Becker, 367
Conservative surgery, Mr. Bryant, 206
Contagious and infectious diseases, occurrence of organic forms in connection with, Dr. J. Burdon-Sanderson, 205
Convulsions, infantile, Dr. H. B. Clarke, 208
Copaiba as a diuretic, E. L. Dixon, L.R.C.P., 81; application to callous ulcers, Dr. F. J. Brown, 305
Copaiva in croup, 365
Copeman, Dr., treatment of rheumatic fever by cynara (artichoke,) 129; vomiting in pregnancy, 447
Carradi, Prof., extirpation of parotid gland, 299
Coryza and sore throat, cotton-wool in the ears as a cure for, 138
Costa, Dr. Da, strain and over-action of heart, 295
Crighton, Dr., digitalis and bromide of potassium in delirium tremens, 130
Croup and diseases that resemble it, Sir W. Jenner, 131; copaiva as a remedy, 365
Cyanides, use in acute rheumatism, Dr. A. Luton, 218

D.

Dawson, Dr., inversion of the uterus, 463
Death rates, the value of as a test of sanitary condition, N. A. Humphreys, 143; Dr. Buchanan, 237
Delirium tremens, digitalis and bromide of potassium in, Dr. Crighton, 130
"Dental Surgery and Pathology," James A. Salter, M.D., F.R.S., 357
Diarrhœa of typhoid fever, Dr. George Johnson, F.R.S., 1; Henry Kennedy, A.B., M.D., 432; treatment of, David Young, M.D., 161; prescriptions for diarrhœa, 162, 163, 164
Dickenson, Dr. W., effects of nicotine in producing amaurosis, 452
"Diet in Health and Disease, Manual of," Dr. T. King Chambers, 443
Digitalis in diphtheria, Dr. J. Holms Joy, 373
Diphtheria, treatment by digitalis, 271; digitalis in, 373
"Diseases of Tropical Climates, and their Treatment," J. A. B. Horton, M.D., 356
Dixon, E. L., L.R.C.P., copaiba as a diuretic, 81
Dreschfeld, Dr. J., some cases of syphilitic nervous disease, 343
Duckworth, Dr. Dyce, F.R.C.P., on relief of toothache by bicarbonate of soda, 260
Duncan, Dr. Mathews, F.R.S. Ed., on peurperal eclampsia, 245
Dugnet, Dr., argyriasis from local application of nitrate of silver, 462
Dusart, M. L, physiological and therapeutical action of phosphate of lime, 58
Dute, Chand, milk treatment in India, 298
Dysentery, 4

E.

"Eczema," Practical Treatise on, Dr. M'Call Anderson, 123
Eklund, Dr. Fr., treatment of uterine flexions, 302
Electro-therapeutics, Dr. Vivian Poore, 205
Electricity in chorea, Dr. Poore, 305
Emetics in the cold stage of ague, Surgeon A. R. Hall, 138; action of the most common, M. Chouppe, 368
Emetine, action of, Dr. Polichronic, 218
Epidemic progression, arithmetic of, Dr. G. Evans, 308
Erysipelas, researches on, Wladimir Lukowsky, 137
Essig, H., pathology and history of lupus, 215
Evans, Dr. George, arithmetic of epidemic progression, 308
Excrement nuisance, 475
Eye-disease, 46; camp for examination in, 51, 52; lenses for examination in, 51; metallic retractor for use in, 104; test-types for use in, 108, 110, 118; visual angle, 109; average acuteness of vision, 111; perimeter for use in, 120

F.

Famine and pestilence, 388
Fayrer, Dr., horse-hair for sutures, 59
Fergus, Dr. A., sources of mischief from sewer air, 284

Fever, typhoid, 5, 10; use of "cold" in, 12; diarrhœa of, 1; sponging of skin, 14; hydropathic treatment of, objected to, 14; tepid bath for, 15; cold water and antiseptic treatment, Dr. Henry Blanc, 209; Mr. William Robert Smith, 293
Fever, investigation of the Lewes outbreak, Dr. Thorne Thorne, 392
Fever, cerebro-spinal, Dr. J. B. Hamilton, 457
Fever, injection of quinine for intermittent, M. Jousset, 212
Fever, puerperal, Dr. R. J. Lee, 290; etiology of, Dr. Huntley, 291
Fever, enteric, at Over Darwen, 315; a case of enteric, Dr. A. L. Carroll, 332
Fibroid tumour, disappearance during administration of chloride of ammonium, Dr. F. W. Hatch, 366
Filth diseases, Mr. John Simon, 468
Fischer, Dr. Hermann, nature of shock, 370
Flagg, Dr. Foster, tooth brushes and tooth powders, 368
Flint, Dr. Austin, remedial use of water, 303
Flückiger and Hanbury's "Pharmacographia," 56
Forrest, Dr., chronic gastralgia cured by nitrate of amyl, 459
Fothergill, J. Milner, M.D., "On the maintenance of health," 201
Fox, Dr. Tilbury, treatment of scabies, 204
"Free Phosphorus in Medicine," J. Ashburton Thompson, 122

G.

Galvanic current, therapeutic use of, Dr. T. Clarke, 289
Garden, Dr., herpes, 217
Gastralgia, chronic, cured by nitrate of amyl, Dr. Forrest, 459
Gee, Dr., on use of cold in typhoid fever, 12
Gelseminum in calculus, Dr. A. Shamblin, 366
Germ theory of disease, Dr. Charlton Bastian, 360
Giné, Dr., treatment of Herpes zoster by morphia, 137
Gibb, Dr., treatment of bronchocele, 206
Gleet, treatment of, Mr. Berkeley Hill, 266
Goa powder and Po di Bahia, Dr. Silva Lima, 363
Gosselin, Prof., best method of using chlorate of potassium topically, 357
Gout and rheumatism, cases and treatment, 90–99, 165–182
Greenhow, Dr. Headlam, Addison's disease, 292
Gum cutting, Dr. C. Buckingham, 302

H.

Hæmaturia, cases of, Dr. E. J. Shearman, M.R.C.P., F.R.C.S., F.R.S.E., 275
Haddon, Dr. John, M.A., treatment of peritonitis and diphtheria by digitalis, 271
Hall, Surgeon A. R., emetics in the cold stage of ague, 138; therapeutic value of balsam copaibæ, 241
Hamilton, Dr. J. B., cerebro-spinal fever, 457
Hammond, Dr., influence of disulphate of quinine upon the intracranial circulation, 295
Hampstead Hospital, 77
Hartshorne, Henry, M.A., M.D., Essentials of Practical Medicine, 446
Hatch, Dr. F. W., disappearance of fibroid tumour during administration of chloride of ammonium, 366
Haynes, Dr. Stanley, lunacy certificates, 376
Head, injuries to the, Mr. J. Hutchinson, 288
Heart, strain and over-action, Dr. Da Costa, 295
Hemiplegia, rational treatment of some forms, Dr. Alfred Carpenter, 321
Herpes, Dr. Garden, 217; Herpes zoster, treatment of, by morphia, Dr. Giné, 137
Hill, Mr. Berkeley, treatment of gleet, 266
Hiller, Dr. Arnold, bacteria and suppuration, 300
Hirt, E., action of volatile substances on white corpuscles, 462
Hogg, Dr. F. R., uses of turpentine, 448
Holderness, Dr. W. B., soda and opium in toothache, 373
Holmes, M., Jaborandi, use of, &c., 296; surgical treatment of aneurism, 447
Homans, Dr. John, intraperitoneal hæmatocele cured by free incision, &c, 461
Horse-hair for sutures, Dr. Fayrer, 59
Horsford, Dr., salicylic acid, 301
Horton, J. A. B., M.D., "Diseases of Tropical Climates and their Treatment," 356
Hospitals for contagious diseases, 77
Mr. Gay, 306

Humphreys, N. A., the value of death-rates as a test of sanitary condition, 143
Hunter, Surgeon Major G., sulphate of cinchonidine, 448
Huntley, Dr., etiology of puerperal fever, 291
Husemann, antidote to carbolic acid, 361
Hutchinson, Mr. Jon., injuries to the head, 288; imperfect teeth and zonular cataract, 292; temperature and circulation after crushing spinal cord, 450
Hydrate of choral, antagonism between it and picrotoxine, 361; remedy for strychnia poisoning, Dr. Charteris, 363
Hydrate of chloral, neutralised by carbonate of soda, M. Oré, 464
"Hygiene," Professor Parkes (Second Notice), 68; "Manual of, Public and Private," Chas. A. Cameron, Ph.D., M.D., 318
Hysteria, treatment by chloride of gold and sodium, Dr. Martini, 452

I.

Iodide of potassium, therapeutical effects of, Dr. J. M. Wilson, 128; therapeutical action, Dr. Kämmerer, 215
Iodide of starch in medicine, Signor Bellini, 460
Infection and epidemic disease, remarks on, Dr. Squire, 221
Intraperitoneal hæmatocele cured by free incision, &c., Dr. John Homans, 461
Ipecacuanha, action of, Dr. Polichronie, 218
Iritis, use of balsam copaibæ, 241

J.

Jaborandi, action of, M. Albert Robin, 56; Mr. Holmes, 296; action of, on digestion, M. Robin, 452
Jackson, Dr. J. E., rheumatism and neuralgia, 207
Jenner, Sir W., croup and diseases that resemble it, 131
Johnson, George, M.D., F.R.S., on the treatment of the diarrhœa of typhoid fever, 1
Jones, Dr. Handfield, treatment of laryngitis by veratrum viride, 207
Joulin, Dr., nitrate of mercury in uterine hæmorrhages, 383
Jousset, M., injection of quinine for intermittent fever, 212
Joy, Dr. J. Holmes, digitalis in diphtheria, 373

K.

Kammerer, Dr., therapeutical action of iodide of potassium, 215
Keen, Dr. W., experiments upon the laryngeal nerves, 371
Keith, Mr., treatment of suppurating ovarian cysts, 211
Kennard, Dr. Thomas, atrophia and veratria in incontinence of urine, 366
Kennedy, Henry, A.B., M.B, treatment of diarrhœa of typhoid fever by diet, 432
Kidneys, tubercular or scrofulous disease, Dr. W. R. Basham, 422; cancer, or malignant disease of, 429
Kirkwood, Mr. George, report on results of major operations, 293
Klein, Dr., on the pathology of small-pox and typhoid fever, review of, by Dr. Lauder Brunton, 5

L.

Local Government Board, sanitary administration of, 399
Laboulbéne, M., turpentine in the treatment of poisoning by phosphorus, 126
Lamp for examination of eye, by Wiess, 51, 52
Laryngeal nerves, experiments, Dr. W. Keen, 371
Laryngitis, treatment of, by veratrum viride, Dr. Handfield Jones, 207
Lawson, Robert, M.B., monobromide of camphor, 262
Lead-poisoning, cases of, Dr. E. G. Shearman, 420
Lecorché, Dr., treatment of Bright's disease, 60
Lee, Dr. R. J., puerperal fevers, 290
Leucocythæmia, use of phosphorus in, 16; case of, 25
Lichen Urticatus, local treatment of, Dr. Mackey, 130
Lima, Dr. Silva, Goa powder and Pedi Bahia, 363
Lobelina, action on the circulation, Dr. Ott, 302, 456
Lukowsky, Wladimir, researches on erysipelas, 137
Lunacy certificates, [illegible] Dr. Stanley

Haynes, 376; voluntary patients, 382; cautions to certificants, 382; resident patients, 384; law relating to insane patients, 386
"Lunatic Asylum Medical Reports," vol. iv., edited by J. Crichton Browne, M.D., F.R.S.E., 199
Lupus, pathology and history of, H. Essig, 215
Luxatio Penis, Dr. Moldenhauer, 299

M.

Mackey, Dr., local treatment of lichen urticatus, 130
Maclean, Dr., diagnosis of Bright's disease, 288
"Maintenance of Health," J. Milner Fothergill, M.D., 201
McGill, Arthur Fergusson, F.R.C.S., the treatment of fractures of the patella and olecranon by the expectant method, 188
Major operations, reports on results, Mr. George Kirkwood, 293
Malgaigne's screw hooks for fracture of the patella, diagrams of, 184
Mammillitis, Dr. Bachelder, 456
Manual of Public Health for Ireland, Grimshaw, Reynolds, Furlong, and Moore, 318
Mapother, E. D., M.D., "Lectures on Skin Diseases," 357
Marshall, Mr., treatment of varicose veins, 205
Martin, Dr. Douglas, alcohol and energy, 210
Martini, Dr., treatment of hysteria by chloride of gold and sodium, 452
Maunder, Mr., surgery of the arteries, 290, 363
Mayençon, M., on the entrance of arsenic and antimony into the tissues and fluids of the body, 133.
"Medicine, Essentials of Practical," Henry Hartshorne, M.A., M.D., 446
"Medico Electric Apparatus and How to Use it," Salt and Son, 286
Milk diet for chronic diarrhœa and dysentery, 4
Milk treatment in India, Chand Dute, 298
Moldenhauer, Dr., Luxatio Penis, 299.
Morbus cordis: emphysema and œdema pulmonum, anasarca, 83; albuminuria, ascites, anasarca, 84
Morphia for diarrhœa, 164
Morphine and codeine derivatives, physiological action, Dr. F. M. Pierce, 437
Moss, Dr., non-nitrogenous diet in disease, 132
Motor centres in cerebral convulsions, 370
Mounier, Dr. Le, sulphate of quinine in erysipelas, 299
Muscular system, action of currents, Dr. Onimus, 401

N.

Nævus of the upper lid, removal of by means of a ligature, M. Talko, 133
Nasal twang in Americans, cause of, Dr. Robinson, 369
Neck of the Femur, structure and pathology, Henry J. Bigelow, 217
Nepveu, Dr., bacteria in subcutaneous effusions, 453
Neville's splints for fracture of the patella, diagram of, 187
Nickel and cobalt, poisonous action of salts of, M. Rabuteau, 56
Nicotine, effects in producing amaurosis, Dr. W. Dickenson, 452
Nitrogen, excretion in urine, Dr. J. Byrne, 302
Nitrite of mercury in uterine hæmorrhages, Dr. Joulin, 366
Non-nitrogenous diet in disease, Dr. Moss, 132
Nocturnal enuresis, cured by hydrate of chloral, Dr. Ademollo, 460
Nussbaum, Professor, transplantation of bone, 459

O.

Obesity, treatment of, M. Philibert, 134
Onimus, Dr., differences of action of constant currents on the muscular system from a clinical point of view, 401
Opium for relief of irritable condition of bowel after an attack of typhoid; in toothache, 373; action of, 462
Oré, M., neutralisation of hydrate of chloral by carbonate of soda, 464
Osio, Dr., abscess of the cornea, 59
Ott, Dr., action of lobelina on the circulation, 302, 456
Over Darwen, enteric fever at, 315
Ozæna, surgical treatment of, M. Rouge, 134

P.

Palm, Dr. P. R., action of asarum canadense, 218
Paralysis, researches on peripheric, 497

Parkes, Professor, on Hygiene (Second Notice), 68
Parotid gland, extirpation of, Professor Conrad, 299
Parturition, quinine in, 458
Patella, use of Malgaigne's screw-hooks in transverse fracture of the, James Spence, F.R.S., 183; fracture of, George W. Callender, F.R.S., 186; Arthur Fergusson M'Gill, F.R.C.S., 188; splint for, Dr. Beach, 303; treatment of by the expectant method, 188
Paul, M., chloral suppositories, 464
Perimeter for use in eye disease, 120
Peritonitis and diphtheria, treatment by digitalis, John Haddon, M.A., M.D, 271
"Pharmacographia," F. A. Flückiger and D. Hanbury, F.R.S., 56
"Pharmacopœial Companion to Visiting List," &c., Robert T. H. Bartley, M.D., 287
Pharynx, removal of a foreign body by pharyngotomy, Dr. W. J. Wheeler, 449
Philibert, M., treatment of obesity, 134
Phillips, Mr. treatment of ulcers by dry earth, 451
Phosphate of lime, physiological and therapeutical action of, M. L. Dusart, 58
Phosphorus, use of in angina, 19; anæmia, 24; leucocythæmia, 26; turpentine in the treatment of poisoning by, M. Laboulbène, 136
Picrotoxine, action of, and autagonism between and chloral hydrate, Dr. J. Crichton Browne, 361
Pierce, Dr. F. M., physiological action of new morphine and codeine derivatives, 437
Placenta prævia, Dr. Chapmanier, 454
Polichronie, Dr., physiological and therapeutical action of ipecacuanha and emetine, 218
Poore, Dr. Vivian, electro-therapeutics, 205; electricity in chorea, 305
Po di Bahia, 363
Porter, Dr., aphonia treated by faradisation, 58
Potain, M., administration of castor oil, 135
Power, Henry, M.B., physiology of micturition and retention of urine, 38
Pregnancy, carbolic acid in vomiting of, 450
Printed Lines, should they be short, 456
Propylamine, what extracted from, 91
Public health degrees and certificates, 149
Puerperal Eclampsia, Dr. Matthews Duncan, F.R.S. Ed., 245
Pyelo-nephritis, induced by stricture, 430
Pyelitis, treatment of calculous, 32, 192, 193; tubercular, 192, 195; scrofulous, 192

Q.

Quinine for diarrhœa, 164; for rheumatism and gout, 97–99, 165–182; influence of disulphate, Dr. Hammond, 295; sulphate of in erysipelas, Dr. Le Mounier, 299: in parturition, Dr. Stafford, 458

R.

Rabuteau, M., poisonous action of salts of nickel and cobalt, 57
Registrar-General's Weekly Return, 159
Renal colic, treatment of, 30
Removal of foreign bodies from the ear, Dr. Cleland, 131
Rhamnus frangula, substitute for castor oil, Dr. Ogilvie Will, 208
Rheumatic fever, treatment of, by cynara (artichoke), Dr. Copeman, 129
Rheumatism and gout with trimethylamine, treatment of, W. H. Spencer, 90–99; cases and treatment, 165–182
Rheumatism and neuralgia, Dr. J. E. Jackson, 217
Rhoren, Dr. Melvin, worms in the urinary bladder, 371
"Ringer's Handbook of Therapeutics," 55
Roberts, F. T., M.D., on the alleged successful treatment of typhoid fever by cold, 10
Robin, M. Albert, actions of jaborandi, 56; on digestion, 452
Robinson, Dr., cause of nasal twang in Americans, 369
Rochard, M., application of thermometer in surgery, 213
Rouge, M., surgical treatment of ozæna, 134
Russell, W. J., Ph.D., F.R.S., and Samuel West, B.A., on a simple process for estimating urea in urine, 86

S.

Salicylic acid, Dr. Heesford, 301
Salt and Son, "Medico-electric Apparatus, and how to use it," 286

Salter, James A., F.R.S., "Dental Surgery and Pathology," 357
Sanitary paradoxer, Mr. Stansfeld as a, 153; administration of the Local Government Board, 399; the new Epoch in legislation, 230, 311; matters in Parliament, 311
Scabies, liniment for, Dr. Clemens, 135; treatment of, Dr. Tilbury Fox, 204
Schirrus, origin of, S. Wolfberg, 58
Sewer-air, sources of mischief from, Dr. A. Fergus, 234; remedy for escape in houses, 375
Shamblin, Dr. A., gelseminum in calculus, 366
Shearman, Dr. E. J., M.R.C.P., F.R.C.S., F.R.S.E., four cases of hæmaturia, 275; cases of lead-poisoning, with albumen in the urine, 420
Sheep-pox, 5
Shock, nature of, Dr. Hermann Fischer, 370
Simon, Mr. J., filth-diseases, 468
"Skin Diseases, Lectures on," E. D. Mapother, M.D., 357
Small-pox and typhoid fever, the pathology of, Dr. Klein, by Dr. Lauder Brunton, 5; prevention of pitting in, Dr. Ward, 130
Smith, Mr. William Robert, typhoid fever, 293
Soda and opium in toothache, Dr. W. B. Holderness, 373
Specific contagia as a cause of disease, Dr. Burdon-Sanderson, 360
Spence, James, F.R.S., on a modification of the method of using Malgaigne's screw-hooks in transverse fracture of the patella, 183
Spencer, W. H., A.M., M.B., on the treatment of rheumatism and gout with trimethylamine, 90, 165
Spinal cord, temperature and circulation after crushing, Mr. J. Hutchinson, 450
Spine, high temperature after injury, Mr. J. W. Teale, 293
Squire, Dr., infection and epidemic disease, 221
Stafford, Dr., quinine in parturition, 458
Stansfeld, Mr., as a sanitary paradoxer, 153
Strassburgh, Dr. G., researches on the action of alcohol in fever, 136
Suppurating ovarian cysts, treatment of, Mr. Keith, 211
Swanzy, Dr., congestion papilla in intracranial disease, 453
Syphilis, treatment of, by moist mercurial fumigation, J. St. S. Wilders, and J. R. Lane, 204
Syphilitic nervous disease, J. Dreschfeld, M.D., 343

T.

Talko, M., removal of a nævus of the upper lid by means of a ligature, 133
Teale, Mr. J. W., high temperature after injury to the spine, 293
Teeth, imperfect, and zonular cataract, Mr. Jonathan Hutchinson, 292
"Therapeutics, Materia Medica, and Toxicology," Dr. H. C. Wood, 55
"Therapeutics, Handbook of," Dr. S. Ringer, 55
Thermometer, application in surgery, M. Rochard, 213
Thompson, J. Ashburton, "Free Phosphorus in Medicine," 122
Thorne, Dr. Thorne, investigation of enteric fever at Lewes, 392
Thudichum, Dr. I., chemical statics of the brain, 293
Tobacco, effect on nervous system, Dr. Brumbaugh, 218
Toothache, bicarbonate of soda for relief of, Dr. Dyce Duckworth, F.R.C.P., 260; relief of, J. Smith Turner, M.R.C.S., 336; mixtures, 338; formula, 465
Tooth brushes and tooth powders, Dr. Foster Flagg, 368
Trimethylamine, history and properties of, 91; use of, 96, 97, 98, 99, 165–182
Tumours of the breast, Mr. Bryant, 289
Turner, J. Smith, M.R.C.S., on relief of toothache, 336
Turpentine, use of, Dr. F. R. Hogg, 448
Turschmann, Dr., poisoning by coffee, 296
Tyndall-typhoid controversy, aspect of the, 63
Types to test acuteness of vision, 108, 110, 118

U.

Ulcer of the stomach, treatment of perforating, Dr. Karl Bettelheim, 61
Ulcers, treatment by dry earth, Mr. Phillips, 451
Urea in urine, process for estimating, W. J. Russell and Samuel West, 86; apparatus for measuring, 88
Urea, elimination of in certain diseases, Mr. West, 126
Urine, physiology of micturition and retention of, 38; analysis of in pneu-

monia, 126; rheumatic fever, 126; Addison's disease, 126; diabetes mellitus, 127; general conclusions of analysis, 127.
Uterine flexions, treatment of, Dr. Fr. Eklund, 302
Uterus, inversion of, Dr. Dawson, 403

V.

Varicose veins, treatment of, Mr. Marshall, 205
Vermiform appendix, disease of the, Dr. Coates, 129
Vital action in life and disease, Dr. Lionel Beale, 361
Vomiting, on the physiology of the act of, W. H. Broadbent, 100
Vomiting in pregnancy, Dr. Copeman, 447

W.

Ward, Dr., prevention of pitting in small-pox, 130
Water, remedial use of, Dr. Austin Flint, 303
West, Mr., elimination of urea in certain diseases, 126
Wheeler, Dr. W. J., removal of a foreign body in the pharynx by pharyngotomy, 449
White, Dr. J. C., poisonous action of arnica on the skin, 302
White corpuscles, action of volatile substances, E. Hirt, 462
Wilders, J. St. S., and J. R. Lane, on the treatment of syphilis by moist mercurial fumigation, 204
Will, Dr. Ogilvie, rhamnus frangula as a substitute for castor oil, 208
Williams, Dr., babies' sore eyes, 301
Wilson, Dr. J. M., therapeutical effects of iodide of potassium, 128
Wolfberg, S., origin of schirrus, 58
Wood's "Therapeutics, Materia Medica, and Toxicology," 55
Wood, Dr. Peter, cardiac weakness a consequence of railway injuries, 291
Worms in the urinary bladder, Dr. Melvin Rhoren, 371

Y.

Young, David, M.D., the treatment of diarrhœa, 161

LONDON: [illegible], AND PARKER, [illegible], OXFORD AND [illegible].

THE PRACTITIONER.

JULY, 1875.

Original Communications.

ON THE PATHOLOGY AND TREATMENT OF CHOLERA.

BY SURGEON A. R. HALL,

Army Medical Department.

BEFORE beginning the subject proper of this paper it may be interesting to the readers of the *Practitioner* to have before them some details of the results obtained by the use of hydrate of chloral in cholera, and I therefore give the experience of Mr. Higginson, Civil Surgeon of Kheri, in Oudh, in his own words, as contained in letters to me:—

"KHERI, *Sept.* 19, 1873.

"I have lately had an opportunity of trying your chloral hydrate treatment of cholera, and am glad to tell you with complete success. On the 9th inst. cholera was reported to have broken out in a village called Chaoneh, only a mile distant from here; three deaths occurred before I got to the place, and none after. I had eight cases to treat. (Native names omitted). (1) aged 30 years; (2) aged 50 years; (3) aged 50 years; (4) aged 20 years; (5) aged 55 years; (6) aged 8 years; (7) aged 18 years; and (8) aged 40 years. Nos. 1 to 4 were attacked on the 9th, No. 5 on the 10th, Nos. 6 and 7 on the 12th, and No. 8 on the 15th. No. 1 is the widow of one of those who

died, and Nos. 6 and 7 are the son and sister of another. The third person who died was the servant of a Brahmin. As the village is so close I was able to visit it twice a day, and so see for myself the effects of the treatment. *I used nothing but chloral hydrate, except quinine during convalescence.* Nos. 3, 4, and 6 were very bad cases; collapse well marked, sunken eyes and cheeks, low, husky voice, pulse imperceptible, suppression of urine for from twenty-four to thirty-six hours, burning sensation in abdomen. In Nos. 1, 2, and 8 the pulse was perceptible, but complete suppression of urine existing. No. 7 was attacked with vomiting while I was in the house attending the little boy. I immediately injected her, and made her keep perfectly quiet, and no further symptoms were developed. She was quite well the next day, and I have no doubt but that the prompt treatment was the cause of this happy result. I used a solution the same strength as you did, that is, ten grains dissolved in a hundred drops of water. My syringe holds twenty drops. Half an hour after injection the same expression was used by each patient as to the effects: "I feel more life in me;" the relaxed vessels were sending more blood to the surface. The injections were made in the arms, and beyond a slight hardness at points of punctures, and slight pain, there was no local evidence twelve hours afterwards of the injections having been made. I was most struck with the change in No. 4 twelve hours after I first saw him; his face had filled out again, and he looked another person. He had four grains at once injected, and four grains more an hour and a half after; passed urine ten hours after the first injection. No. 6, the little boy, was a bad case. I injected ten drops = one grain at 8 A.M.; repeated it in an hour. At 4.30 P.M. again injected ten drops, and repeated it an hour after; in all four grains. The following morning I found him fast asleep; he had passed urine during the night. Three days after he was up, and playing about as usual. No 2 was the mildest developed case; I only injected twenty drops = two grains, once in her; this was in the evening; the next morning she was sitting up out of bed. With the exception of No. 7, each one of these persons was more or less in collapse when I saw them, and considering the difficulties one has to contend with when treating

sick people in a *native village*, I think the results are wonderful. All these people are exceedingly poor, and I had to provide some of them with a little money to buy such nourishment as was to be had, and scanty enough it was; their convalescence was of course delayed. I of course enforced stringent sanitary measures as soon as I got to the village, and this will account for the small number of cases. Fifteen years ago they say this same village was decimated by cholera, and they had it to a less extent six years ago. The relaxation of the arteries by the sedative action of the chloral was amply proved by the altered appearance of the patients within twelve hours, their faces filling out, as it were, the eyes losing the sunken look, and the pulse reappearing at the wrist."

"KHERI, *Sept.* 21.

"Since I wrote to you there have been two more cases in the village Chaoneh; one, a woman, died *an hour* after she was attacked, and before I had time to get out: the other a boy, aged seven, living in the same house, I found in collapse; duration of attack 4½ hours; pulse at wrist imperceptible, eyes sunken, voice low and husky, great restlessness, &c. I at once injected ten drops of the solution in each arm; half an hour after I could feel the pulse at the wrist, and the boy looked and felt better. I left a native doctor in charge of him, and the next morning when I visited the village he was sound asleep, had passed urine during the night, had three loose motions since time of injection; he is now quite well again. This makes nine cases seen and treated by me, and *no deaths*."

"KHERI, *Sept.* 23.

"I have some more successful cases to tell you of—one of such a nature as to remove any doubt from my mind of the value of the treatment. On Sunday, after I had posted my letter to you, I got a report that there was a fresh case at Chaoneh, a woman. I saw her four hours after she was attacked, and found her in severe collapse. Judging from my experience of other remedies, I thought it was no go this time, and that she must die. She had had about twenty motions in the first two hours, and then they ceased; pulse imperceptible at wrist, severe cramps, great restlessness, complaining greatly of abdominal pain, voice very

faint, and breath really icy cold—altogether the worst case yet. I injected twenty drops in the left arm once, and in the right arm twice = 6 grains; half an hour after, twenty drops in left arm; an hour and a half after first injection, injected twenty drops into each thigh; these latter had a magical effect over the pains in the legs, which had been very distressing. Shortly after this, about two hours after the first injection, I could feel the pulse again at the wrist; the woman lay on her side, and began to doze. I saw her again in the evening; pulse distinct at wrist, and pain ceased; injected twenty drops in right arm; this made fourteen grains altogether, the largest quantity I have used yet in any one case. Yesterday, at morning visit, she was much improved in appearance, had slept during the night, passed four watery motions, no urine; evening visit, pulse good and strong, no urine yet. To-day, morning visit, *passed urine twice during the night*, weak, otherwise well. I look upon this case as a triumph; nothing could have been worse than her condition when I first saw her.

"On Sunday night a girl aged eight years was attacked, and died within four hours, before I had time to get to the village. Since then I have stationed a native doctor at the place. There have been five fatal cases now, none of which I had an opportunity of treating. Yesterday there were three fresh cases, but the native doctor being on the spot, injected them at once, and when I saw them in the evening choleraic symptoms had passed off, and to-day they are quite well. There has been no preliminary diarrhœa in any of these cases; they were all attacked immediately with the characteristic motions and vomits. It is quite reasonable to say that the three cases yesterday would have gone on to collapse had they not been taken in time, so that I have had thirteen cases now, and *all cures*."

"KHERI, *Sept*, 26.

"I'm sorry to say I have an unsuccessful case to tell you of, but I think the result was mainly due to the stupidity of the native doctor left in charge. The particulars are as follows:—The woman was attacked about three o'clock in the morning; she was seen shortly after by the native doctor stationed at the village, who injected twenty drops of the solution twice in the

left arm and once in the right. I saw her at 6.30; she was then in intense collapse. I injected twenty drops into each thigh; quarter-hour after, twenty drops in right arm; half-hour after this, twenty drops in each arm. At eight o'clock I could feel the pulse at the wrist once more, and there were evident signs of reaction; I then had to return home to my other work, and instructed the native doctor to inject again if the pulse did not improve in an hour. The fellow says that up to nine o'clock the woman went on well; she then got a little worse, but as she had already had eight injections, he was *afraid* to inject more than ten drops in each arm, and after that did nothing more. The woman died at one o'clock.

"I regret extremely that I was not able to remain in the village, but it was simply impossible; however, one death only in seventeen cases[1] is still unexampled; and my belief in the treatment is not shaken one whit. I really think if I could have stayed the woman would not have died, after my success with the case I told you of in my last letter. It looks bad, though, for the success of the treatment in the hands of native doctors."

[The following paper was read before the Royal Medical and Chirurgical Society, Oct. 13, 1874.]

The encouraging success that has attended the treatment of the cold stage of cholera by the hypodermic injection of chloral hydrate in the cases in which it has been tried, induces me to bring the subject before the notice of the medical profession in England. The fact that the Government of India attach so much importance to the matter as to have published letters from Mr. Higginson, the Civil Surgeon of Kheri, in Oudh, and myself, concerning it, in their official Gazette of Feb. 14, 1874, is also very satisfactory. These reports were published in a letter in the *Times* of August 15, 1874.

During a continuous service of upwards of eleven years in Bengal, I have seen a good deal of cholera. I have suffered from it myself; and I think it may be of interest to describe, as tending to throw some light on the pathology of the disease,

[1] Details of the last two cases mentioned in the *Gazette of India* were not sent to me by Mr. Higginson.

what particularly struck me in my own symptoms, and the conclusions I have drawn from them and from the writings of various authors.

While doing duty with troops who were suffering from an epidemic, in April 1864, I had a severe attack. The first thing that I specially noticed was the entire absence of all griping, colic, or straining, while the purging was going on. The stools seemed to be expelled by the contraction of all the muscular fibres of the intestines themselves, without any assistance from the abdominal muscles. I noticed that my pulse was hard and then small before it ceased to be felt at the wrist. But what struck me as curious was the fact that my heart was beating forcibly all the time! The absence of pulse therefore did not seem to me to be caused by exhaustion of the heart's power, or a tendency to syncope.

The cramps in my arms and legs were very torturing. There was total suppression of urine for about twenty-four hours. My voice at first was rather shrill and *squeaky* before it became what is called *sepulchral*. The rice-water evacuations were ejected at frequent intervals, and the vomiting was almost incessant. I craved for liquids, and drank cold water and soda-water for a time, only to expel them with a spasmodic rush. I did not experience any *nausea;* when the fluid reached the stomach it seemed to be expelled by the rapid contraction of the muscular coats of that organ. I am thankful to say no stimulants were given to me, and I lived through the attack. I retained my consciousness the whole time, and recovered without much secondary fever.

After this experience I naturally took more interest than ever in studying the disease. The writings of Dr. Brown-Séquard seemed to me to lead to the conclusion that *irritation* of the vaso-motor portions of the sympathetic nervous system would account for many, if not all, the symptoms of the collapse of cholera. When I read Dr. George Johnson's "Notes on Cholera," I felt convinced that the *asphyxia* produced by the contraction of the pulmonary arterioles was apparently the chief condition to be overcome.

Without indulging here in speculations as to what *causes* cholera, I think I may say that the comparative rapidity with

which persons who survive an attack generally regain their health, tends to prove that no serious *permanent* changes have taken place, either in the blood or the intestinal canal. When oxygen can gain free access to the blood, and water is supplied in sufficient quantity, the blood seems to be able to perform all its functions properly. Dr. Parkes, years ago, denied that the turbidity of the rice-water evacuations was occasioned entirely by the presence of epithelium, and the recent investigations of Drs. Lewis and Cunningham, in Calcutta, confirm the denial.

We have then, apparently, to deal with some morbid influence which acts with fearful violence for a time. It often kills rapidly, but if the patient does not succumb, he gets well pretty quickly. The question is—What state is he actually in, and what can be done to keep him alive?

In May 1869 I wrote a paper, entitled "Thoughts about Cholera," which was published in the *Indian Annals of Medical Science* for March 1870. Some months previously, a number of printed questions had been circulated, to be answered by various medical officers in Bengal, in order that the different opinions held on the subject might be recorded. One of the questions was:—Does collapse depend upon paralysis of the sympathetic nerve? To this I wrote "No." Dr. Brown-Séquard sums up the results of his well-known experiments by asserting that the parts supplied by the sympathetic, when that nerve is *divided* (or *paralysed*), show: (1) Dilatation of blood-vessels; (2) Afflux of blood; and (3) Increase of vital properties; while galvanisation of the nerve is followed by (1) Contraction of blood-vessels; (2) Diminution of blood; and (3) Decrease of vital properties. It seemed to me therefore to be more probable that the sympathetic nerve is in an *irritated* state, rather than paralysed.

I think that the different symptoms of the collapse of cholera lead to the conclusion that the morbid influence (whatever it may be) exercises a stimulating action on the vaso-motor portion of the sympathetic nervous system, producing increased heart action, contraction of the muscular walls of the arteries, and, at first, augmented blood-pressure. The increase of arterial tension is first shown by a hard pulse. This afterwards becomes small, because there is very little blood in the artery. I am sorry that I have not been able to obtain sphygmographic tracings of

the pulse as yet. Dr. Parkes has pointed out the frequency of copious micturition of limpid urine at this early period. This flow has been shown by Traube to be intimately related to high arterial pressure; but when the state of muscular activity passes on into cramp-like spasm, there is total suppression of urine. This is probably due to complete closure of the renal arterioles.

A sensation of burning heat at the epigastrium is often experienced in collapse. This may be due to a hyperæmic condition of the solar plexus. The condition of irritability of the sympathetic produces, through its vaso-motor nerves, spasm of the muscular coats of *all* the arteries of the body. *The heart contracts forcibly, but cannot dilate normally, its muscular walls being spasmodically affected.* This is a point that I wish to bring prominently forward. I believe that the irritation and hyperactivity of the vaso-motor portion of the sympathetic is so great that the *inhibitory* or dilating action of the vagus on the heart is not able to control it.

Dr. Aitken, noticing the appearance of the heart after death, as observed by Dr. Parkes, writes:—"The right side of the heart and the pulmonary arteries were generally filled, and in some cases distended with blood; the left side and aorta were generally empty, or contained only a very small quantity of dark blood; the left side evidently had received little or no blood, but had continued to contract, in some cases even violently, on the last drop of blood which had entered it." I fancy that both sides of the heart are influenced in the same way by the same causes, and contract violently. The left heart gets very little blood sent over to it by the right heart, in consequence of the contracted pulmonary arterioles, and is therefore comparatively empty; though, while life lasts, it must get *some* blood. The right heart gets a considerable quantity forced into it by the gorged vena cava and other systemic veins, but cannot send it into the lungs, also because of the contracted pulmonary arterioles. It is therefore full of blood, and is found so after death.

We have then, I presume, the following conditions:—At first, increased blood-pressure, caused by the heart beating strongly, forcing the blood through contracted arteries. As the disease

advances, the heart, though contracting forcibly, gets very little blood from the lungs, and therefore has only that little to send into the arteries. The systemic veins are gorged with blood, which occasions the *blue* colour of the face and surface of the body.

The peculiar choleraic voice is one of the first symptoms that attracts attention in this disease. One thing seems evident, that this peculiar voice does not depend on deficiency of air entering and leaving the lungs. If a cholera patient is desired to take a deep breath, he can generally do so. A considerable quantity of air is heard rushing into the thorax, and if one's hand is put to the mouth, the breath can be felt coming out pretty strongly, only very cold. I cannot help thinking that we must attempt to explain the existence of this voice by the effect produced on the larynx by the abnormal condition of the nerves which supply its muscles.

Violent cramps in the voluntary muscles are felt in most cases, which occasion the real pain in collapse. Dr. C. B. Radcliffe, in "The Dynamics of Nerve and Muscle," says that contraction of muscle is a temporary death. It is, in fact, an imperfect *rigor mortis*, which condition is seen so strongly marked in persons who die in collapse. The cramps in cholera may therefore be caused by the cutting off of the blood-supply to portions of the muscles by the contracted state of their arterioles.

The vomiting is apparently due to spasm of the coats of the stomach caused by the hyperactivity of its nerve-supply; and the evacuations from the bowels may be the result of exudation from the distended venous radicles of the portal system, which partake of the general venous engorgement; for Niemeyer has shown that when the arteries are contracted there is venous distension. I am aware that many facts have been observed which go to prove that the rice-water fluid is the result of *secretion* and not of transudation. The celebrated experiments of Moreau bear particularly on the point. Lately, in this country, Dr. Lauder Brunton has been carrying out a series of experiments on the nerves supplying the intestines, some of which he was kind enough to allow me to witness, and for which I take this opportunity of thanking him. But time will not permit me to go into this question here, and I beg, for

the present, to leave it an open one. It is clinically interesting to know that the purging is not accompanied by any of that pain known to us as *colic*. The intestinal activity of cholera is absolutely painless. The *packed* condition of the intestines (in which they are seen drawn back to the spine, and occupying much less space than usual in the abdomen), described by Sir William Gull and Dr. Baly, is probably produced by great contraction of *all* the longitudinal as well as the circular fibres. *But I look upon the vomiting and purging as of secondary importance*. The worst cases, those of so-called *cholera sicca*, appear to die of *asphyxia* before much fluid can be thrown out by the stomach and intestines; for though rice-water fluid is found in the intestines in these cases after death, there is nothing like the quantity that is often expelled during life in other and less severe cases. According to my idea, the morbid influence is expending its force most fatally on the heart and lungs, through the vaso-motor centres, and to these our whole attention must be directed.

It is also a matter of clinical fact that in the worst cases there is absolute suppression of bile secretion and urine. These facts point to the spasmodic condition of the arterioles of the liver and kidney. The blood is shut off from the liver cells and Malpighian tufts. The gall-bladder, however, is usually found full, or half full, after death. The general condition of spasm of the involuntary muscular system has probably involved the circular fibres of the bile-duct, and so prevented the bile (which had been secreted since solid food was last taken, and before the state of spasm had set in) from being poured into the intestines.

The urinary bladder is generally contracted to the "size of a walnut," as has been remarked.

It has also been observed that abortions frequently occur in pregnant women when attacked by cholera, and that the fœtus has been often expelled *alive*, proving that the miscarriage was not caused by the death of the embryo. Of course, the contracted state of the mother's blood-vessels may cause the death of the child in time by stopping the utero-placental circulation; but I fancy that the uterus often contracts before this is brought about.

One of the chief peculiarities about this disease is, that while such fearful disturbance is going on in the body, the intellect is generally unaffected. If there was really a tendency to syncope, we should probably oftener see loss of consciousness.

I now beg to bring forward what I consider to be the right principle on which to treat collapse of cholera. Presuming the morbid state against which we have to contend to be one of asphyxia, caused by spasms of involuntary muscular fibres, due to a condition of hyperactivity of the sympathetic nervous system, the logical inference distinctly points to the exhibition of a remedy calculated to neutralise this condition. Such remedies are to be found in the class of agents which directly depress the activity of the muscular fibres of the circulatory apparatus.

In my paper above referred to, I pointed out that it is no good giving medicines by the mouth, as they are generally immediately rejected. I suggested the *hypodermic injection of pure sedatives*, which, if given in sufficient quantities, actually do produce syncope by their palsying action on the heart. When I wrote that paper chloral hydrate had only recently been discovered.

In India, medical men do not enjoy the same opportunities of getting the newest remedies and profiting by the latest discoveries as their more fortunate professional brethren in England. At that time I had never seen chloral hydrate, and did not know what its real therapeutic action was.

I enumerated the sedatives, as given in Dr. Headland's "Action of Medicines," which I thought might be useful, viz., tartar-emetic, ipecacuanha, digitalis, aconite, hydrocyanic acid, and some others. But tartar-emetic and ipecacuanha are too irritating to the *skin itself* for hypodermic injections, and digitalis has been proved by Dr. Milner Fothergill to be a direct cardiac stimulant. I procured Dr. Fothergill's essay in 1872, and Surgeon-Major Collis (of "The Buffs") and myself performed a number of experiments on bull-frogs (about 1½ lbs. in weight, and twelve inches in length) with digitalis and other drugs, which produce an effect on the circulation through the nervous system. We found that chloral hydrate caused the death of the frogs, with the heart in the most *complete diastole*,

thereby proving that it is one of the most powerful vascular sedatives that we possess.

It so happened that I had not an opportunity of trying the hypodermic injection of a pure sedative till August 1873. I then had a soldier in collapse under my care. I dissolved ten grains of chloral hydrate in 100 minims of water, and injected this quantity under the skin of the arms, in four different places. The record of this case will be found in the *Indian Medical Gazette* for November 1873. Reaction was established in about five hours, and the patient made an excellent recovery, without any inconvenience from the punctures.

In September 1873 Mr. Higginson, the Civil Surgeon of Kheri, in Oudh, treated nineteen cases on this plan, and only two died (one of whom might probably have been saved if the native doctor left in charge had carried out his instructions.) The letters preceding this paper refer to seventeen of these cases. These results speak for themselves. Of course a great many more cases will be required to prove the efficacy of this treatment, but at all events it is a good beginning.

I attach great importance to the strength of the solution used; one part of chloral hydrate to ten of water. If it is stronger than this it will probably not be absorbed into the blood, and only cause ulceration, or perhaps sloughing. Mr. M'Reddie, the Civil Surgeon of Hurdui, in Oudh, reported unfavourably on the hypodermic method, in the *Indian Medical Gazette* for December 1872; but he dissolved twenty grains of chloral in sixty minims of water, which was much too strong.

I cannot here go into the subject of the secondary fever. I believe this to be a condition closely allied to heat apoplexy, and will only say that it would appear probable that the activity of the muscular walls of the blood-vessels is followed by a period of relaxation. This really is a partial paralysis, the result of exhaustion. In this dilated condition of the systemic arterioles, I have found quinine and a combination of stimulants and tonics to be the best treatment.

I hope now that I shall awaken sufficient interest in favour of the *sedative treatment of choleraic collapse.* When we hear sometimes of 80 per cent. of *those treated* dying, it is high time that some other plan than the usual stimulating one should be

tried; and I believe that, practically, the subcutaneous injection of chloral hydrate is the best to adopt. All I ask for is a fair impartial trial. If this plan fails, it will share the fate of numerous predecessors: but if it really answers, and is proved to be a successful mode of treatment, it will not only save many lives, but will allay the sickening panic that spreads like lightning among a population when any of their number are stricken with malignant cholera, the greatest scourge of modern times.

GOA POWDER AND POH DI BAHIA IN THE TREATMENT OF ECZEMA MARGINATUM.

BY G. THIN, M.D.

THE curative effects of a secret remedy, named Goa powder, in the parasitic diseases of the skin common in India, have been recently described by Dr. Fayrer; and Dr. Da Silva Lima has pointed out that this powder and another, named Poh di Bahia, are probably identical with the Araroba powder which is a popular and valuable remedy in Brazil for the same class of complaints.

I have lately had testimony presented to me that both Goa powder and Poh di Bahia are effectual in removing probably the most obstinate and inveterate parasitic skin disease which exists. The disease to which I refer is the Eczema marginatum of Hebra, and is known in England as Burmese or Chinese Ringworm.

The discovery by Köbner that the tricophyton tonsurans can be found in the epidermic scales which are scratched from the skin affected by this disease has led him and most other dermatologists to regard Eczema marginatum as a peculiar development of common ringworm, resulting from the conditions of heat and moisture present on the inner surface of the thigh where it is in contact with the scrotum—the part of the body in which it is most frequently found.

This idea has found a following in England. Hebra, however, while admitting the existence of the tricophyton tonsurans, still insists on an essential difference between the two diseases.

I can only account for the readiness with which Köbner's conclusions have been accepted by the rarity of the disease in

Europe, but assuredly these are but little in harmony with observations made in countries where it is common. A short statement of the most salient features of Eczema marginatum as seen in China will not only illustrate the importance of the virtues undoubtedly possessed by Goa powder and Poh di Bahia, but may, I believe, contribute facts of some value in deciding as to whether this disease is identical or not with Tinea circinata (Herpes tonsurans).

Whilst resident in Shanghai I had frequently occasion to treat common ringworm, and under the ordinary simple remedies the disease disappeared as readily as it does in England. I had also to treat a disease which I then (as I do now) considered a very different one, the disease graphically described by Hebra as Eczema marginatum, characterised by a hard, raised, infiltrated margin, most commonly curving downwards on the inner surface of the thigh, or backwards over the hips, but also occasionally found independently on other parts of the body. This disease, on whatever part it was found, was easily distinguished from ordinary ringworm by its objective characters, and the result of treatment showed that the distinction was based on a radical difference.

It often required months of treatment before the disease was subdued, and then the cure was only temporary; with the cessation of treatment there was, after a shorter or longer interval, almost invariably a fresh outbreak. In many cases the disease seemed practically ineradicable.

My fellow-practitioners, as far as I knew, had no better success; patients who went to England and were treated at home returned to China uncured. One of the most aggravated cases I have seen was that of a naval officer who consulted me in the Red Sea on his journey eastward after a two years' sojourn in England, during which time he had tried in vain a variety of applications in order to remove the disease, which had been contracted in China six years previously. Most patients eventually contented themselves by keeping their complaint in check by occasionally painting the surface with tincture of iodine. By this treatment it sometimes remained quiescent for months, after which it would unexpectedly reappear, generally on the part on which it was originally situated, but sometimes also on other parts

Such are some of the features of this disease, between which and Tinea circinata practitioners in China have no hesitation in drawing a broad line. It is not a common disease in Europe. It is evidently oftener met with in Vienna than in England, if we except patients who have contracted it abroad.

The cases diagnosed in Vienna by Hebra as Eczema marginatum I could identify as being examples of the same disease with which I was familiar in China.

A worse case than any I have met with in China I had an opportunity of seeing at Hebra's *clinique*. This man had contracted the disease from wet packing-sheets at a hydropathic establishment in Austria, and although he had been under treatment by different dermatologists for several years, the malady had progressed from bad to worse. At the time I saw him, the margins of two circles, one on each side, extended upwards over the back, and, bending forwards under the axillæ, nearly met at the navel. In this case there had been the same resistance to antiparasitic treatment which I have already indicated as characteristic.

While ready to admit the value of Köbner's observations and experiments, I cannot, in the face of these striking clinical differences, believe that two diseases which need never be confounded, and where they are common never are confounded, are to be considered identical on the sole ground of the same parasite being found in both. The facility with which Köbner cured his patients by applications of solution of bichloride of mercury, oleum cadini, benzin, and the like, is irreconcilable with my experience of the disease.

After I had returned to Europe, my friend Dr. Henderson wrote me from Shanghai that a remedy for Eczema marginatum had been introduced there by a druggist, and that by its means the profession were at last able to cope with the disease. This remedy was Goa powder, and it soon became a popular and successful means of cure.

I have at present under my care a patient suffering from the disease, which he contracted in the East. He came to me in March of this year, and as the history of his ailments is not only interesting in connection with Goa powder and Poh di Bahia, but as showing what is the ordinary average course of

the complaint, I have asked him to write me an account of his case. His notes are as follows :—

"In 1863–64, when in Singapore and Hong Kong, I got China ringworm. I first noticed it on my left thigh. I paid no particular attention to it, and used to apply iodine, which never killed it, but I think prevented it from spreading. I fancy I have always had a slight piece of this patch remaining, and in different parts of the body. In 1870–72, when in Shanghai, the old patch on the thigh became as large as a crown-piece, and before long I should think it was 2½ inches in diameter. I then found I had another similar patch on my shin, and another round my navel (two inches), and another at the bottom of the spine (a crown-piece). Another on my left arm began to show shortly, and then a piece on my right. No one seemed to know how to cure it, but I recollected hearing of a powder that was to be got in Singapore, called Poh di Bahia, and which was used there as a certain cure. I procured half a dozen bottles, and gave some to one or two other ringworm martyrs. I applied it by mixing a little with vinegar and then rubbing it on the place. After about six applications, if the patient's skin is tender, it gets very red and irritable, and little pieces of skin come off in time, and the ring remains a polished red. It took nearly all my ringworm away, and I thought no more about the one or two small patches left. In fact, as you will understand, it becomes irksome after a time, and there was no system in my applications, but I think I used to apply it at least a dozen times, and in some spots twenty, before the ring went away.

"In about the beginning of 1873 I found my thigh patch had come back again—from the little spot uncured, no doubt. In the meantime there had been imported from Bombay some powder very similar to Poh di Bahia, called Goa powder. I tried this, and it cured me again. But, on coming home in April 1874, the barber shaved me on board ship, and I noticed about a fortnight afterwards a small reddish spot on my chin, which I attribute to infection conveyed by the razor, one instrument being used to shave the motley crowd formed amongst the passengers and crew of a P. and O. steamer. This grew rapidly, and in a month was as big as a sixpence. When I got home I found that there was also a patch about a crown in

size on the middle of my back between the shoulder-blades; also a small patch on my right arm. I got some Goa powder in London, but I fancy it was very old. I had previously been using what I got in Shanghai with a good result, but this seemed to be less strong, as it did not irritate so much. However, I reduced the patch on my arm to about the size of a fourpenny-piece, and to a very pale pink colour, but the chin got worse, and the circle on the back did not go away."

When I saw him I found that the patch on the chin (which had now existed for ten months) consisted of a red raised surface about a line in breadth, which, in the form of the segment of a circle, passed from the centre of the lower lip where the mucous membrane becomes continuous with the skin, outwards to about half an inch from the inferior border of the lower jaw. The affected surface felt hard under the finger.

On the anterior surface of the middle third of the thigh there was a slightly elevated ring of thickened skin, forming a circle about two inches in diameter, the induration being more marked at some parts than at others. The colour was natural. The patch on the shoulder constituted a circle about three inches in diameter. It was not formed by a continuous ring, but by a number of slightly elevated indurated nodules. The colour of the skin was normal.

The patient had come to me confessedly because he could not procure the remedies in which he had confidence. I had been struck by the rapid and apparently successful results of the treatment applied by Hebra in the case to which I have already referred. This consisted in applying Wilkinson's scabies ointment, as modified by Hebra,[1] to the part, by rubbing it in vigorously with a hard brush twice daily; the treatment to be continued for a week, during which time the part was not to be washed.

I directed my patient to institute a similar treatment, but to discontinue the application to the skin as soon as the irritation produced became severe. He was able to continue it for the prescribed time on the back and thigh, and when I saw him a fortnight afterwards the induration and all signs of a ring had

[1] ℞ Flor. Sulph.; Ol. Fagi, *āā. unc. ss.*; Cretæ albæ, *unc. quatuor*; Sapon. viridis; Axung. *āā. libram.*

disappeared on these parts. The irritation produced on the chin had been so great that the treatment had to be intermitted several times, but at the end of a month nothing remained of the original red indurated surface, although the superficial irritation produced by the ointment had not altogether disappeared.

The feeling of tension and irritation of the skin produced by Hebra's treatment is so great that any less disagreeable method of cure is much to be desired. In Poh di Bahia this would seem to have been found. My patient prefers it to the Goa powder with which he was supplied in China, and considers it not only a less irritating but a more speedy remedy than that by which I have just succeeded in ridding him once more of his enemy, which, efficacious although it has undoubtedly been, he considers, in the light of his former experiences, to be in comparison but a *pis aller*.

A GOOD WAY TO DISTEND THE LOWER BOWEL IN INTUSSUSCEPTION.

BY DOUGLAS MORTON, M.D.

Physician to the Louisville Hospital, Kentucky, U.S.

HAVING no nearer approach to an inflating apparatus at hand than a Davidson's syringe, a few nights since, when it became evident I had a case of intussusception to deal with, I determined to distend the bowel with gas generated within. To this end, after putting my patient as deeply under the influence of chloroform as I could with safety, in order to get as complete relaxation as possible, I injected successively about a third (for the patient was a young infant) of each of a pair of Seidlitz powders dissolved in an ounce and a half of water. Believing the carbonate solution would be less irritant, I injected it first. Then, quickly after throwing in the acid, I pressed my left hand against the anus, using my right at the same time with a sort of kneading action over the colon, in which I thought the trouble lay, to forcibly distend the whole length of gut. After keeping this up a minute or two, I allowed the gas to escape. Under the influence of chloral and opium the child passed a comparatively comfortable night, and on the following morning passed natural-looking fæces ; and has had no trouble since.

This innovation upon the old Hippocratic method by inflation, I think presents advantages sufficiently obvious not to need comment, and is worthy of being made known to the profession.

A CONTRIBUTION TO THE CLINICAL HISTORY OF SCARLATINAL CONVALESCENCE.

BY F. A. MAHOMED, M.D., M.R.C.P.,

Pathologist and Medical Tutor to St. Mary's Hospital; late Resident Medical Officer to the London Fever Hospital.

THE consideration of the large annual mortality from scarlatina and its sequelæ should, and indeed must necessarily, lead us to the most careful study of a disease whose ravages are so widespread and whose impression on the constitutions of its victims is frequently so indelible. Among that class of specific blood-poisons usually comprised in the term "fevers," to which we are liable in this country, there is none more to be feared, especially among the upper classes, than the disease in question. For while small-pox is under restraint and its severity universally mitigated by vaccination, typhus is confined to the extreme poor, and enteric is now universally admitted to be preventible, scarlet fever still retains its old features, and annually kills or maims its undiminished quota of victims.

It is not the object of this paper to discuss the disease itself in its first or acute stage, or to prove or even to suggest how far it may be prevented by attention to sanitary conditions and by perfect drainage; nevertheless one cannot but remark how frequently this disease is seen to precede, accompany, or follow enteric fever in the same household (a fact which, together with a certain clinical similitude, doubtless led Dr. Harley to the conclusion of their identity), and still more how frequently it is preceded by sore-throat, slight attacks of erysipelas, or general malaise, in a house or among a community in which it afterwards declares itself. These facts appear to indicate that the sewer frequently conveys the specific contagium; at the

same time the evidence is very strong which proves that atmospheric influences are not the least among the factors of its existence. In connection with these matters, however, it appears certain that a vast amount of work remains to be done, which will not only go far to rid the community of another scourge, but also throw fresh light on our imperfect pathology of fevers. At present it may suffice to discuss some points connected with the convalescent state which may prove of interest to the physician if not of value to the patient.

For this purpose it will be unnecessary to distinguish between the various forms of scarlatina with which the sufferer may be afflicted; the history of the convalescence is the same in the broad outlines which it is here desired to indicate, whether the patient has escaped with the mildest possible form of the disease, with a rash hardly discoverable and a temperature never higher than 100°, or whether on the other hand he has suffered from its most malignant type, with delirium, vomiting, and suppressed rash that is compatible with recovery. It will be seen in the accompanying table that the disease during this period may be divided into several distinct stages, each of which has its characteristic symptoms, and during each a tendency to certain complications exists.

Symptoms, &c.	First Week.	Second Week.	Third Week.		Fourth Week.
			First Half.	Second Half.	
General Condition	Primary fever.	Defervescence.	Reaction.	Crisis.	Recovery.
Temperature	Rising.	Falling.	Low.	Invariable rise.	Normal.
Pulse	Quick, full, & rather hard.	Quick & soft. Slow & soft	Quick & soft. Slow and soft.	Slow and hard. Normal.	Slow & hard. Normal
Quantity of Urine	Scanty.	Increasing.	Very copious.	Diminished.	Diminished. Normal.
Quantity of Urea	Rather increased.	More increasd.	Still increased	Diminished. Normal.	Diminished Normal.
Quantity of Uric Acid	Normal.	Increased from 10th to 14th days.	Diminishing.	Normal.	Normal.
Actn. of Liver	Increased.	Increased.	Diminishing.	Torpid. Normal.	Torpid. Normal.
Desquamation	None.	Commencing.	Increasing.	Profuse.	Profuse.
Contagion	Little.	Increasing.	Great.	Very great.	Very great.
Complications	Intestinal, &c	Delirium, &c. Rheumatism.	None.	Albuminuria. Diarrhœa. Enlrg. glands	Albuminuria, &c.
Treatment	Bed.	Bed.	Bed.	Bed.	Baths & get up.
Diet	Milk.	Milk.	Milk.	Milk.	Fish.

In a case of medium severity in which the characteristic symptoms have been well marked about the sixth or seventh day, when the temperature has passed its maximum and is

beginning to fall, the following symptoms occasionally occur and form the most common complication between the seventh and fourteenth days. Although defervescence has commenced and convalescence is approaching, the patient is found sleepless and frequently becomes delirious, the delirium simulating in a marked degree that of delirium tremens. Suspicious, noisy, chattering, twitching, and haunted by delusions, he obtains no sleep, assumes a worn-out appearance, yet his temperature and pulse are both falling, and his condition need give rise to no anxiety: improvement will soon be gained by perseverance in the milk diet, and the exhibition of opium, or in some cases of chloral; occasionally, however, this condition of delirium becomes one of acute mania, and one instance of this which lately came under observation at the Fever Hospital terminated fatally. Though these symptoms are usually attributed to exhaustion, it is not easy to accept this view, for they most frequently occur in patients whose fever has not been severe, but rather of a mild type. Blood-poisoning would appear to more easily account for it, for there are many examples of delirium and sleeplessness arising from such a cause, as in typhus, erysipelas, alcoholism, gout, and many other conditions; moreover, Dr. Murchison has ascribed the "typhoid state" and its attendant delirium to uræmia, which he has attributed to excessive functional activity of the liver; a condition which will be noticed hereafter as occurring to a great extent in scarlet fever.

The latter part of this period, that is to say, from the tenth to the fourteenth days, is the time when these patients are most liable to rheumatism and to its attendant peri- and endo-carditis, and in connection with this it is interesting to notice the condition of the urine: this secretion passes through various well-marked alterations during the disease; during the first week of the fever the urine is scanty in quantity, loaded with lithates of high specific gravity, acid reaction, and sometimes contains a small quantity of albumen of venous (or febrile) origin. From the seventh to the fourteenth days the urine increases in quantity, loses its deposit of lithates and its albumen, has a highly acid reaction, and, on adding the nitric acid, by allowing it to trickle down the side of the test-tube and accumulate

at the bottom, a heavy uric acid cloud appears; this appearance invariably occurs, and coincidently with it the rheumatism exists. Is it that the rheumatism and the uric acid in the urine are alike due to *derangement* of the function of the liver? or is it rather to excessive functional activity of that organ? It would appear that it is the latter condition which exists, and for the following reasons:—First, it is not very uncommon to find a slight amount of jaundice in the acute stage of the disease, accompanied by dark stools and indicating congestion of the liver. Secondly, there is an increased disintegration of albuminous material occurring in the liver during both this first and second stage, as evidenced by the great increase of urea and urates which is invariably found in the urine, the increase being greater during the second week. Thirdly, the pulse at this time is soft and not of high tension, as we shall afterwards find it become when albuminuria and decrease of urea in the urine, from functional derangement or inactivity of the liver, occurs; indicating that the increased production of urea and uric acid by the liver does not constitute a form of blood-poison which interferes with the capillary circulation, and produces albuminuria by increasing arterial tension: this observation derives further support from the rarity with which rheumatism and albuminuria are found coexistent in the same patient at the same time, both being apparently due to derangement of the liver, but this being of an opposite nature in each; when albuminuria does coexist with rheumatism, it is of the venous form, and takes its origin from another cause, namely, chill.

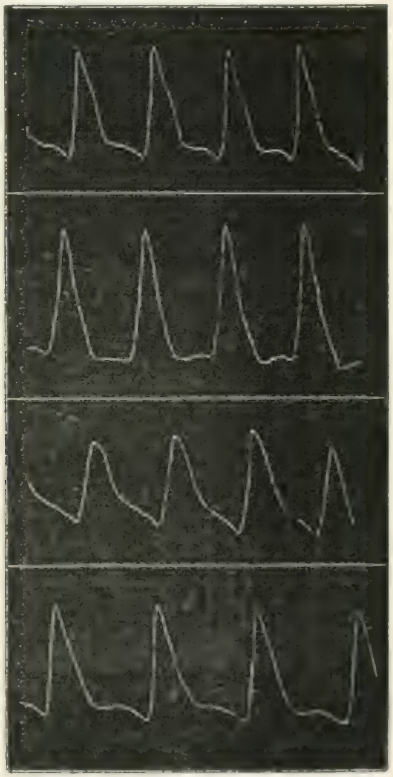
To return to the typical case supposed to be under observation. The temperature, which has been steadily falling during the second week, reaches its normal point, or perhaps not lower than 99°, on the fourteenth day; and during the third week, or at least during the first four or five days of it, remains nearly stationary.

Meanwhile the urine has increased very greatly in quantity, the patient sometimes passing as much as 2,500 c.c. (about 4½ pints) in the twenty-four hours; it has moreover lost its intensely acid reaction and become alkaline; it is of a pale greenish colour, of lower specific gravity, and has a disgusting and putrid smell. The urea excreted in the twenty-four hours

continues excessive. Desquamation has become well marked and is proceeding rapidly. Discharges from the nose, ears, and mouth may be present, and will be referred to hereafter.

The pulse, to which it is particularly desired to call attention, is now especially of interest to the physician. Unlike its usual character in fever, the pulse in scarlet fever is *never dicrotic*, that is to say, not markedly so. Even in the worst cases during the first stage, the writer has never found the pulse hyperdicrotic;

FIG. 1.— *Tracings during the Acute Stage.*



it is usually full and sharp, with a tendency to hardness and with a striking absence of dicrotism. The tracings reproduced in Fig. 1 are specimens presenting its usual characteristics during the acute stage, they were all obtained from the same patient on various days during a sharp attack of the fever.

During the second week in favourable cases its frequency becomes reduced and its character assumes that of the normal, soft, and full type. In some cases, however—and these require great care and close watching during their convalescence, they occur most frequently in children—the pulse, instead of becoming diminished in frequency at the end of the second week, continues rapid; the other symptoms may be apparently favourable, the temperature having fallen to 99° or even lower; the child, however, will frequently look pale, and not be very bright, and his stools are not unfrequently green and offensive. These indications are of the greatest value practically, for they foreshadow coming danger which may be guarded against by warmth, milk diet, and gentle purgatives. Constipation or chill would now produce the most disastrous consequences. If such a case as this go on in the usual way, it will be found that about the eighteenth to the twenty-second day his pulse will suddenly fall in frequency and become perhaps abnormally slow, often as low as 40 per minute, having previously been stationary at 110 or 120 for some days. The physician will probably hail this alteration with delight, and possibly report a great improvement to the friends; but his confidence will be misplaced if he relies on it as a sign of improvement, and he will be doomed to disappointment. The sudden fall in rapidity of the pulse at this crisis means sudden increase of arteria tension, and of this it is the surest sign; the pulse will be felt at the same time to become hard and full, the vessel remaining distended during diastole, the expansion being slow and sustained, and the artery assuming a whipcord or rigid character, so that it can be rolled under the finger. At the same time it may become somewhat irregular, a phenomenon which always occurs coincidently with a change of pressure in the arterial system. This condition requires no sphygmograph to detect it, although it was first recognised by its aid, but reveals itself to the educated touch of any careful observer.

If now the urine be examined, it will be found to be either albuminous or about to become so, the condition of pre-albuminuria existing. Before proceeding to describe this condition, it may be noted that this period of the disease, namely, from the eighteenth to the twenty-second day, is the time when

albuminuria or some inflammatory lesion is most likely to occur. But even if the patient pass through this crisis in safety without any secondary complication declaring itself, the temperature will frequently be found to rise one or two degrees without any apparent cause. But if not so fortunate, it will sometimes rapidly rise in the course of a few hours, occasionally as high as 105°, while some glands in the neck equally suddenly become swollen and painful; this state of things will not unfrequently pass off in from twenty-four to forty-eight hours, in other cases they will remain enlarged for several days or even weeks, and yet in others they may go on to the formation of suppurating bubo; the latter condition, however, is more frequently of slow production, and a direct though tardy consequence of the primary inflammatory mischief. Instead of this glandular affection, the patient may suffer from an attack of ear-ache, attended with more or less fever, and relieved in the course of a day or so by the appearance of a discharge from the meatus; inflammation and discharge from the ear at this period of the disease appear to affect almost invariably the auditory canal, and to be of a harmless character, and not attended by permanent deafness; while, as in the case of suppurating glands, that inflammation of the ear which is attended by suppuration in the tympanic cavity, destruction of the ossicula auditus, and perforation of the membrana tympani, appears to originate in the first or acute stage by extension of inflammation from the throat along the Eustachian canal. To this class of sequelæ belongs the troublesome and offensive ozæna to which these cases are liable; it is invariably the remains of local mischief extending from the throat and originating during the primary fever: so also does the low febrile state, very closely resembling typhoid, which is occasionally present in this disease, accompanied by more or less diarrhœa and intestinal irritation; these symptoms are due to the intestinal affection and swelling of the solitary glands, which occur during the first stage of the fever. Allusion is made to these conditions merely to exclude them from the proper complications of scarlatinal convalescence, which alone it is proposed to discuss in this paper.

Before discussing the complications of inflamed cervical glands

and otorrhœa, one word as to their cause. Why should scarlet fever be so frequently associated with these lesions? Why should the disease especially attack these parts? May it not be that the original disease has no connection with these affections? may not another cause be sought for their presence? Glandular inflammations, more especially in the cervical region, and otorrhœa, are most frequently found in connection with the strumous diathesis, and so far his own observation has impressed the writer most strongly with the belief that it is in strumous subjects that these affections are found as complications of scarlet fever; he regards them therefore as independent of any actual connection with the scarlatinal poison, but rather as due to the strumous taint which is now most apt to declare itself on account of the weakly state of the patient; the treatment which proves most effectual, moreover, is that employed for the latter condition. In the same manner the bronchitis and pneumonia often occurring at this period may perhaps be referred to a tubercular tendency, or be due to what is popularly termed "a weak chest," or, more scientifically, an unusually susceptible bronchial mucous membrane. The same reasoning does not account, however, for the albuminuria which is so frequent an accompaniment of this condition.

The writer has shown elsewhere (Trans. R. Med. Chi. Soc. 1874), in a paper on the etiology of Bright's disease, that the presence of a poison in the blood, such as scarlatina, erysipelas, gout, lead, and many other conditions, or imperfect assimilation of food, as in functional derangement of the liver or increased effete material in the blood, as in pregnancy, all give a tendency to albuminuria by altering the relation between blood and tissue, and producing high tension in the arterial system; in all of these conditions the excretory system is overtaxed, and if either the skin or the bowels are prevented performing their excretory function by either chill or constipation, the condition is intensified, increased work is thrown on the kidneys, and albuminuria is produced. To these predisposing conditions may be added two others which have also been mentioned as causes of albuminuria: the one, damage to a large portion of cutaneous surface, as from a burn or acute eczema, a cause which is present to an extreme degree in scarlatina; the other,

cold to the surface, a cause which very readily operates on scarlatinal patients on account of the delicate condition of their new skin. We have then in scarlatinal convalescents four important conditions, each or all of which may produce albuminuria. First, a derangement of the liver; second, destruction of cutaneous surface; third, a tendency to chill; fourth, the presence of a specific blood-poison.

It is impossible in a paper of this description to enter fully into a discussion of the forms and causes of albuminuria following scarlet fever; a short reference to each may, however, be attempted. They are presented here in a tabular form, and the actual cause of the albuminuria, the condition of urine, the state of arterial tension, and their etiology also indicated.

ALBUMINURIA.

Form.	Cause.	Cond. of Urine.	Arterial Tension.	Etiology.
Arterial .	Transudation from Malpighian tufts.	Quantity diminished. Paraglobuline. Albumen, blood.	Always high.	Blood-poisons. Constipation.
Venous . .	Transudation from tubular plexus.	Quantity normal. Albumen. No paraglobuline or blood.	*May be low.* Usually high.	Chill. Intense fever. Heart or pulmonary disease, &c.
Arterio-venous .	Transudation from dilatation of capillary vessels.	Quantity increasing. Albumen. Often blood.	Diminishing towards recovery.	Chronic condition of either preceding causes.

Albuminuria may be regarded as the symptom of certain conditions which, if allowed to continue, would produce disease of the kidney and other excretory organs, but the disease does not in the first instance arise in those organs. Before describing these conditions it will be as well first to explain two indications that will frequently be referred to. The sphygmographic signs of high tension are as follows: A sharp point at the apex of the tracing, representing an increase in the percussion element of the pulse; a prolonged sustension of the tidal wave, indicating a prolonged and laboured systole of the heart; a slow collapse

of the artery, and the ability of the pulse to overcome considerable pressure, as shown by its power to raise the lever of the sphygmograph when a pressure much greater than usual is employed.

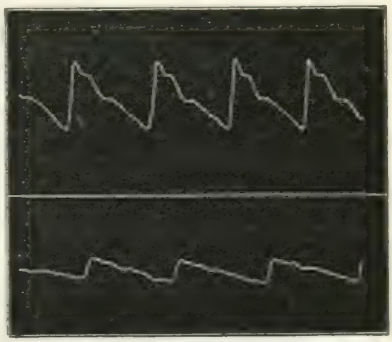
Under certain conditions the writer has shown that a constituent of the blood may be present in the urine when no albumen or any other abnormal element can be detected; no reaction being obtainable with the nitric acid test when most delicately applied, no blood-cells can be discovered by the microscope; no colouring matter of the blood can be seen by the eye or detected by the spectroscope; its presence is invariably associated with high tension in the pulse; it usually precedes, accompanies, or persists after arterial albuminuria; it is detected by the use of the guaiacum test for blood, which is employed as follows: a few drops of urine are placed in a small test-tube, a drop of tincture of guaiacum is added, and then a few drops of ozonic ether; after agitation the ether rises to the top, and if the abnormal element which is believed to be *paraglobuline* be present, a blue colour is produced, which is extracted from the mixture by the ether, and forms a brilliant blue upper stratum.

By the assistance of these indications we are able to classify albuminuria into three distinct forms, which have the following clinical histories:—

The mildest form of arterial albuminuria will be found to occur almost without any constitutional symptoms about the end of the third week. Most frequently the patient may have been a little constipated (one day passed without an action of the bowels is usually sufficient to produce it), and it will be found that his pulse is harder than normal; if a tracing be taken, well-marked signs of high tension will be found; he will have slight subconjunctival œdema, the first sound of the heart will be a little prolonged and perhaps reduplicated—a symptom pointed out by Dr. Sibson as indicating high arterial tension in chronic Bright's disease. On examining the urine, a blue reaction more or less intense will be obtained with the guaiacum test; no albumen may be present if the case is taken sufficiently early, but on the following day it will appear; if the urine has been measured and the quantitative analysis for

urea be performed throughout the illness, both will now be found somewhat decreased. Beyond these symptoms, however, there will be none; the patient will express himself as feeling quite well, and there will be neither nausea, vomiting, headache, pain in the loins, nor increase of temperature. A sharp purgative administered in this stage will almost invariably remove all the symptoms; the paraglobuline, the albumen, and the high tension will all disappear in a few hours.

FIG. 2.—*Effect of Purgation on Albuminuria.*



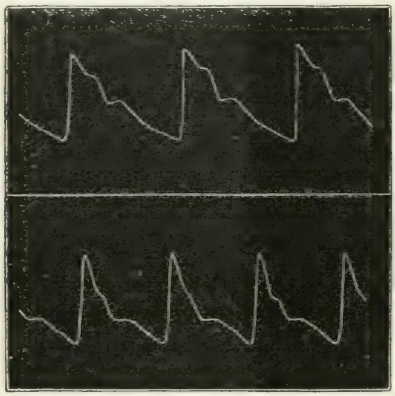
This, however, is a sketch of the most favourable form; a form which is due almost entirely to constipation, and can be easily overcome. The first cases observed by the writer were all of this mild nature, and they gave the impression that albuminuria could be checked immediately if taken early enough but during the present epidemic it was soon found necessary to modify this opinion. The variability of the disease at different periods and during different epidemics has always been a matter of common remark. The albuminuria which now prevailed was of a much more severe type, but it nevertheless proved amenable to treatment, and out of a large number of cases observed at the Fever Hospital, not a single death occurred; all except one, who was a gouty subject and a hard drinker, entirely recovered before leaving the hospital, and only one went on to dropsy, and this only existed for two or three days.

This more severe form appears to be due to a larger dose of poison; constipation has little or nothing to do with its pro-

duction, the bowels being often relaxed at the time of the attack. Such cases partake more of an "inflammatory" nature, and begin with rigors, a rise of temperature up to 102° or higher, and the urine becomes distinctly bloody almost on the first day, and is greatly reduced in quantity; these patients frequently have vomiting and not seldom diarrhœa; they look puffy in the face, and have a good deal of constitutional disturbance; in fact, they all have the well-known symptoms of acute nephritis; the urine will frequently continue bloody for several weeks, and at the same time more or less scanty; the secretion gradually increasing in quantity and arterial tension coincidently diminishing as the condition improves. With milk diet, sweating in hot packs, purgatives, and flannel next the skin, they all recover sooner or later. These cases, like the others, all exhibit high arterial tension from the commencement, and the desired object is to reduce it.

Venous albuminuria also occurs at this period; it is due to a chill of the skin: this occasionally might be the exciting cause of the inflammatory form just mentioned, but such cases come under the head of arterial albuminuria. More frequently chill

FIG. 3.—*Effect of hot pack on Albuminuria.*

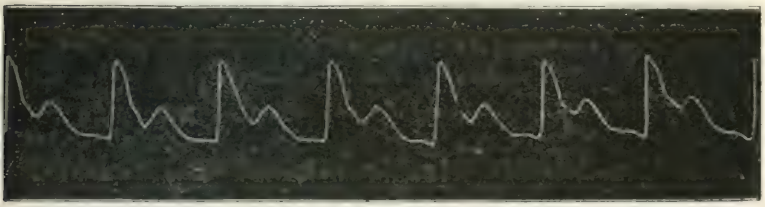


Tracings obtained within two hours of each other.

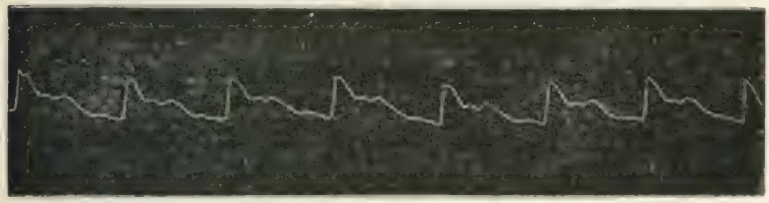
or exposure to cold gives rise to a much milder form, undistinguishable from the first set of cases, except that while the urine may be highly albuminous, it never gives any reaction with the guaiacum test or contains blood in any form. The tension of

the pulse is increased, but not so markedly so, and sometimes not at all; no complaint is made of any constitutional symptoms. Such cases as these are frequently curable, if detected at their commencement, in an hour or so by the hot pack; the urine passed immediately before the patient is placed in the pack being albuminous, while immediately afterwards it is normal; the arterial tension at the same time being rapidly reduced. Other cases, again, are of longer duration, especially if the condition has become well established before treatment is commenced. So susceptible are scarlatinal convalescents to chill, that two cases came under the observation of the writer in which albuminous urine was secreted immediately the patients left their beds, the secretion becoming normal as soon as they returned to them, the change being instantaneous; the experiment could be repeated several times in one day. In these cases the pulse-tension was hardly perceptibly increased, and no reaction with the guaiacum test could ever be obtained with their urine.

FIG. 4.—*Effect of Bathing on the Pulse.*



Before Bath. Urine normal.



After Bath. Urine albuminous.

Exactly similar results have been obtained from observations made on the effect of cold bathing in the healthy subject. In these cases temporary albuminuria resulted after ten or fifteen minutes' immersion, although actively engaged in swimming

a similar result to those previously reported by Dr. Johnson. The urine in these cases gave no reaction with the guaiacum test, and the arterial tension was not increased; the arteries becoming contracted, the pulse smaller and varying with respiration, showing congestion of the right heart; the veins were turgid, albuminuria evidently resulting from transudation from the venous capillaries; slight cough and increased bronchial secretion indicated also slight temporary congestion of the lungs.

The same characteristics occur in the pulse and urine when albuminuria occurs in the course of a severe fever, or as secondary to heart-disease or bronchitis; in these cases it is undoubtedly due to venous congestion; blood only appears in the urine in very severe examples of these conditions, and then owing to rupture of venous capillaries from pressure.

The last form has been designated *arterio-venous albuminuria*. It is not due to any active congestion, but to chronic dilatation of the renal capillaries after acute congestion, from their inability to recover their normal tone, thus permitting a prolonged drain of albumen from them; blood may or may not be present. The cause may have been removed, and the arterial tension having been gradually reduced may have become normal, the urine being increased in quantity and being sometimes excessive, although albumen is still present.

There is a peculiar characteristic of the urine which frequently occurs in connection with this state; it is found after the disappearance of chronic albuminuria, where the patient is anæmic, or in other cases in which anæmia has occurred after scarlet fever, but without albumen being present in the urine, although the patient looks "puffy," and from his general condition albuminuria would be suspected. In these conditions, after adding nitric acid as before described to form a lower stratum in the test-tube, a violet or purple ring is found almost immediately above the acid. If to a specimen of this urine an equal quantity of strong hydrochloric acid be added, the whole agitated and allowed to stand for some hours, a deep blue colour is produced with a deposit of indican. This symptom is frequently found in idiopathic anæmia, peritonitis, and other conditions attended by anæmia and exhaustions. It has also been described

as resulting from diseases of the spinal cord. It has been stated to be due to disintegration of blood-corpuscles, but its pathological significance has not yet been definitely determined.

These cases of chronic albuminuria frequently derive benefit from digitalis; possibly ergot might be effectual (the writer has no experience of its use, though from its physiological action it would appear to be indicated); tonics and change of air have so far proved the most reliable, attention to the bowels and flannel next the skin being indispensable.

Such, then, is a rapid enumeration of the most frequent complications of the convalescence from scarlet fever. Although the end of the third week has been mentioned as the time when they most frequently occur, still the rule has many exceptions, and they occasionally occur earlier, but more frequently later in the disease. The latest period I have known albuminuria to occur for the *first* time was in the seventh week.

There is a phenomenon of scarlet fever which does not appear to be described in the ordinary literature of the disease, but which occurs not unfrequently to some extent, namely, a relapse of the primary fever. A partial relapse, taking the form of a fresh inflammation about the fauces, with swelling of the tonsils, headache, and fever, often occurs about the end of the second week, or perhaps a little later. This might not be regarded as in any way a relapse or recurrence of the primary fever, were it not for the fact that occasionally more well-marked examples occur. Twice the writer has seen an unmistakable scarlet rash appear, together with sore-throat, vomiting, and intense fever (in one case the temperature rose to 106°), in patients who, a fortnight previously, had passed through an undoubted attack of scarlet fever, and in whom, at the time of the second attack, desquamation had already commenced. Such cases are worthy of note, as their occurrence on some occasions might lead to the supposition of error in diagnosis on the part of another or of oneself.

Lastly, one other question suggests itself which is of the greatest importance both to the friends of the patient and to the public generally: At what time after an attack of scarlet fever may a patient be considered free from contagion, that is, unable to impart the disease to others? The experience of the

writer would lead him to place it at three months. The time undoubtedly is uncertain and variable, but of these facts there can be no doubt: every patient is highly contagious at a month, nearly all remain more or less so at six weeks, many are still so at eight weeks; the longest period observed when a patient appeared to impart the disease to another was eleven weeks. Such cases must be examined with care, and many fallacies excluded; and some of these instances alluded to cannot stand the test of thorough investigation without some chance for fallacy being discovered. In one of the last observed, however, a child returned to her home after seven weeks' residence in the hospital, when desquamation appeared thoroughly complete; she had had very numerous carbolic baths; she did not take with her a single article of clothing she had worn in the hospital, and during her absence from home her twin sister and a baby (the whole of the family) had been perfectly free from any form of sickness; two days after her return her twin sister began to be peevish and irritable, six days after a rash appeared, and on the following day she was admitted with a sharp attack of scarlet fever. This case is only one of many, though few appeared to me to be so free from possible error.

One word more, on the management of scarlatinal convalescence, which appears not unfrequently to receive less attention than it deserves. The patients are allowed to leave their beds too soon, they are frequently ordered a highly nitrogenised diet, they are too soon left to take care of themselves, and often allowed too early to associate with their friends. Dr. Broadbent's wise rule at the Fever Hospital is to keep these patients three weeks in bed; the longer they are kept on milk diet the better, for the less excretory work their kidneys have to perform, the less the liability to albuminuria; they take numerous carbolic baths during their convalescence, and do not leave the hospital till desquamation appears to be complete, which is never less than six weeks, and often as long as eight or more. If in addition to these precautions a convalescent home for scarlatinal patients could be established in which they might spend their third month, it would probably prove highly beneficial both to the patients and those liable to come in contact with them.

ON THE TREATMENT OF A COMMON COLD.

BY J. MILNER FOTHERGILL, M.D.

THERE are few ailments more commonly put before us for treatment than an ordinary cold. Of course they are most frequent in winter, but nevertheless they occur at all seasons, even in the burning days of July. Whenever and wherever they are met, they are the consequences of a chill, either to the general surface or to a portion of it. Ordinarily the body temperature is maintained by the equilibrium existing betwixt the internal heat-producing area and the external heat-losing area—the surface—according to Rosenthal. When excessive heat-loss is not met by increased heat-production, a chill or lowering of the body temperature is the consequence; or if heat-production has been great, as in a ball-room, for instance, the cutaneous vessels are dilated, and if the surface be suddenly exposed to cold these dilated vessels are apt to be paralysed instead of incited to contract, and then heat is rapidly lost from the mass of warm blood in the cutaneous vessels. The catching cold, or the escape from doing so, depends upon the state of the vessels of the surface and their capacity to contract or the opposite. Consequently we can see that catching cold or escaping it under apparently identical circumstances depends upon a condition far removed from either vision or sensation. That the *modus operandi* of catching cold under these circumstances has afforded opportunity for difference of opinion, can be no matter for surprise. Rosenthal, however, has scientifically investigated the matter and unravelled the mystery. Where heat-loss is met by heat-production at the time, no unpleasant conse-

quences result; but when the heat-regulating processes are delayed, the loss of heat and fall of temperature at the time are followed by an excessive heat-production, constituting a pyretic condition. This in its simplest form is recognised as a cold. Usually it is accompanied by some disturbance of the respiratory tract, either in the turbinated bones, known as nasal catarrh, as sore-throat, or as an attack of bronchitis. Of course these local inflammations may become very severe, and in bronchitis life is commonly threatened. There is at this point great vascularity of the internal heat-producing area, and a dry skin, whose heat-losing power is impaired from the loss of the aid of perspiration: for Leyden found that even the insensible perspiration is lost in increasing fever.

What are the indications furnished to us for the treatment of this state of matters? Obviously to restore the balance betwixt the two heat-producing and heat-losing areas; and in order to do so we resort to such measures as shall increase the amount of blood in the outer area, and so diminish the amount in the internal area; that is, to increase heat-loss and lessen heat-production.

The measures ordinarily resorted to for such ends are hot fluids, a warm bed, and often a dose of opium in some form. The result of such combination is the induction of perspiration, especially if the patient lie in bed next morning and have more hot fluids: for perspiration is most successfully induced from seven to nine in the morning. If the cold be caught at once by such measures the impending pyrexia may be averted, and the temperature equilibrium be maintained. More commonly, however, the case is more advanced when seen, and the pyrexia is clearly established. Under these circumstances the treatment will need to be more prolonged, and the restoration of the heat-balance will not be so readily attained. The condition of increased vascularity of the heat-producing area with arrested action of the skin is to be met by the administration of agents which possess the combined properties of lowering the heart's action and relaxing the vessels of the skin; or, in other words, which relax the two muscular ends of the circulation, the central and the peripheral. The impression so made produces a diminution in the blood-current and a dilatation of the

vessels of the heat-losing area. As a consequence of this there is less blood in the internal area and less heat-production, with cutaneous vascularity and increased heat-loss. Rarely, however, is any impression made upon the pyrexia until the action of the skin is excited and the cooling effects of exhalation attained. The administration of nauseant diaphoretics to attain these ends has been the rule amidst practitioners and housewives. The time-honoured antimonial wine has scarcely yet yielded to its rival ipecacuan, nor, perhaps, is it desirable that it should. Their combination is good and to be recommended. In adults, iodide of potassium in guaiac mixture forms an excellent combination, especially when the cold is combined with rheumatic pains, or tonsillitis. These internal remedies may be aided in their action by external measures, such as warm baths. With children it is easy to wrap them up in a blanket wrung out of hot water, to enclose them so wrapped in a dry blanket, and to put them into bed. This may be repeated as required, and sufficiently aids the remedies given by the mouth. Measures for giving adults a warm bath in bed are now to be procured at little cost. After perspiration is once induced there is usually a gradual fall of temperature; but the normal may not be reached for some days. There is a decided tendency to excessive heat-loss after the action of the skin has been established, even though the temperature indoors be above the normal. Experience has taught humanity to wrap up well when passing through a cold, especially when it is breaking. Ere the action of the skin is re-established, the impression of external cold is grateful, but afterwards chills are readily experienced. The increase of blood in the heat-losing area permits of rapid heat-loss. When a cold is caught during the restorative period it is usually a fixed one, and not rarely serious illness is the consequence.

When the action of the skin is re-established, it not uncommonly happens that perspiration is profuse, even while the patients wrapt up well to shield themselves from heat-loss. This is a troublesome stage in the history of a cold. Here mineral acids with vegetable tonics are indicated, and perhaps best of all, dilute phosphoric acid in sarsaparilla or cinchona. In the treatment of influenza, vegetable acids along with a bitter

tonic often produce a decidedly good effect. In addition to the general effect of the tonic, the arrest of the excessive activity of the sudoriparous glands is desirable. This stage is sometimes a prolonged one, and the maintenance of a pyretic condition by the rapid loss of heat and then increased heat-production is not an uncommon event. If this condition be pronounced, the best line of treatment is that of quinine with an astringent mineral acid. Quinine is well known to possess an apyretic action, probably to some extent by its effects upon the nerve-centres, and more, according to the observations of Binz, upon its checking the ozonising action of the blood. The effect of the astringent mineral acid upon the skin is to check secretion, and by these combined measures a satisfactory restoration to the ordinary state of health is induced.

In the treatment of the bronchial affections which so commonly accompany an ordinary cold, it is not a matter of indifference what expectorant remedy is selected. As long as the skin is dry and the bronchial lining membrane tumid and secretion arrested, ipecacuan with acetate of ammonia is indicated: or a little antimony may be added with advantage. When the skin is once thrown into action and the bronchial secretion also established, then acid with syrup of squills are suitable measures. But it is not a successful plan to administer squill with acids until the skin is moist. When there is a tendency to the free action of the skin, this latter combination in full doses is a useful plan of treatment. Neither is the union of carbonate of ammonia and senega in severe cases indicated until the secretion alike of the skin and the bronchial lining membrane is thoroughly established.

The treatment of a cold consists really in hastening and abbreviating the ordinary processes by which a rude disturbance of the temperature-balance of the body is recovered from. In order to do this a fair comprehension of the natural processes must exist, so that the remedial measures may harmonise with and not contradict these natural processes.

Reviews.

Cyclopædia of the Practice of Medicine. Edited by Dr. H. von Ziemssen. Vols. I. and II.: Acute Infectious Diseases. London: Sampson Low and Co.

We in England believe not only that we know better than they do in any other country how to cure diseases, but that we can describe them better. In a certain sense this claim is well founded, for the medical literature of no other country contains delineations of those aspects of disease that present themselves to the man who looks at it exclusively with a view to its treatment, which are at the same time so graphic and concise as those which are to be found in the writings of English physicians and surgeons.

In Germany, on the other hand, we are apt, rightly or wrongly, to suppose that disease is regarded not so much as an enemy to be struggled against by all the means which experience has taught us to regard as effectual for overcoming it, but rather as an interesting subject of scientific study—a pathological process of which the constituent and concomitant phenomena have to be weighed, measured, and compared with normal standards, and the results accurately recorded.

It is quite justifiable to call this naturalistic way of investigating disease unpractical, because it cannot be rightly employed in practice; for the primary duty of the practitioner is not to investigate, but to use knowledge already acquired by experience for the good of the patient. But with a view to the advancement of medicine, *i.e.*, to the increasing of the power which man possesses over disease, the systematic study of its origin and nature is everything. For this object, therefore, quite independently of its immediate application to therapeutics, it is as much our duty to do our utmost to promote the scientific investigation of disease as to possess ourselves of that practical knowledge, founded on our own experience and that of others, by which we are guided in its treatment.

We therefore regard it as an event of considerable importance in medical literature that a great work on clinical medicine, which professes to embody the results of German observations on the phenomena of disease, should appear in the English language.

Up the present time, English books on medicine have probably been better known to our German cousins than theirs to ourselves; for, on the one hand, there are few persons in this country who know German sufficiently well to read it with facility, and, on the other, it has been the practice for many years past to translate the best English works into German.

As our readers are no doubt aware, we owe the translation into English of this great Cyclopædia of German Clinical Medicine to the industry and zeal of American writers, all of whom, so far as can be judged from what has yet appeared, have accomplished their several tasks with great literary skill. Of the fifteen volumes of which the work will consist when complete, seven have been already published in German. Of the translation two have appeared, and it is announced that the others will be issued at regular intervals of three months, so that the work will be completed within three years of the present time. We are told in the "announcement" that the entire range of special pathology and therapeutics will be included, but that great pains will be taken not to give to any one subject more prominence than is due to it, so that while each subject is dealt with by a writer specially conversant with it, the unity of the whole will be preserved.

We further learn from the same document that in the preparation of the succeeding volumes several English writers, among whom may be mentioned Mr. Power and Dr. Buchanan Baxter, have undertaken to co-operate in the work of translation, and that Dr. Palmer, who is now in London, is anxious to enter into further arrangements of the same kind.

The two volumes now before us relate to the infective diseases. The names of most of the contributors are already familiar to English pathological students. The article on typhoid fever is by Prof. Liebermeister, of Basle, to whom, more than to anyone else, we are idebted for the reintroduction on the basis of exact clinical observation of the external application of cold in the treatment of pyrexia. The same author contributes a short prefatory essay on infective diseases in general, in which he sets forth in clear but cautious language those general views as to the nature of the infective process which he shares with most of his fellow workers. After giving a short historical account of the doctrines prevalent at various periods in the history of medicine, as to the etiology of epidemic and contagious diseases, he draws attention to that one doctrine which has survived all the fluctuations of medical opinion and now appear to be likely to be accepted as generally, by practical men, as it was before unanimously rejected.

"The prophecy which I believed myself justified in making in 1865, viz., that the theory of a *contagium vivum* would soon

be the prevailing one, and that under its influence investigation would take directions that would probably lead to results of the greatest theoretical and practical importance—this prophecy has actually been fulfilled in part during the last few years. . . . . It is true that the triumph of the theory of a *contagium vivum* is in no way complete, and, as in former times, so now, it is not so much its opponents, as it is its imprudent adherents, who threaten to bring the theory into discredit. The utter lack of critical discernment and method which have characterised some of the works in this field, and, on the other hand, the recklessness with which facts of uncertain significance have been proclaimed certain proofs, have also in our time driven away many an earnest investigator. But there is good ground for the hope that such extravagances will not permanently influence its recognition, and that methodical investigation will continue to gain a mastery over the question, and that the weight of undeniable facts, which are exposed to light in increasing numbers daily, will finally overcome every obstacle."

We have quoted this passage at length for two reasons: first because, as regards doctrine, the writer, so to speak, strikes in it the keynote, of which the vibrations or those of its overtones are heard more or less distinctly throughout the whole work; and secondly, because it affords an excellent specimen of the style of the translation, and may serve to satisfy the reader that the translators have done their German into such readable English that he will often find it easy to forget that he has not an original production before him.

The article on typhus is by Prof. Lebert of Breslau, with whom many of us were personally acquainted some twenty years ago as M. Lebert of Paris. It is more than twenty years since he enunciated those microscopical fictions about cancer cells, typhus cells, tubercle cells, &c., which were for years taught in English schools of medicine as if they had been scientific truths founded on observation. It is long since the German professor repudiated the errors of his youth. He repeats the recantation in his etiological introduction to the three essays on relapsing fever, typhus, and cholera, but not quite so frankly as could be wished.

Neither in Lebert's essay on typhus nor in that of Liebermeister on typhoid will the reader find anything to be compared in scientific weight with our own original works on these diseases. Typhoid and typhus are pre-eminently English diseases, and have been treated by English physicians with a completeness which is not likely to be equalled even in Germany. But it is satisfactory to find that both writers have testified their appreciation of the laborious exactitude of Murchison and the convincing logic of Budd.

Relapsing fever has, of late years, become naturalised in Northern Germany, so that already the German literature of the subject is much richer than ours. In Breslau several very remarkable epidemics have come under the observation of Dr. Lebert, so that his treatise on this disease will be of exceptional value. The reader will find in it an admirable account of the author's recent experiences.

English pathologists will also be delighted to possess the elaborate treatise of Dr. Oertel on his own special subject, diphtheria. It contains not only the products of the author's own researches as to the pathology of the diphtheritic process, and particularly as to the relation between the local affection and the constitutional state, but a very complete account of all that has been accomplished during the last few years by other German observers. The purely clinical and therapeutical aspects of the subject are also treated with great completeness.

Space will not allow us to do more than mention the other subjects treated of in these volumes:—Cholera, by Prof. Lebert; plague, by Prof. Liebermeister; yellow fever, by Dr. Hänisch; dysentery, by Prof. Heubner; chicken-pox, measles, and scarlatina, by Prof. Thomas, of Leipsic; small-pox, by Dr. Curschmann; erysipelas, by Dr. Zuelzer; cerebro-spinal meningitis, by the editor, Prof. v. Ziemssen.

The merits of this admirable work are so unquestionable that we need have no hesitation in pointing out one or two defects. As regards style the translation is excellent, but it is to be regretted that more consideration was not given to the selection of suitable English equivalents of German scientific terms. For example, in the general title the expression "Infectious Diseases" is used as equivalent to Infections-Krankheiten. We need not point out that the English word "infectious" means "catching" (in German *ansteckend*), and therefore cannot be correctly applied, for example, to cholera. English pathologists use the word "infective" to designate those diseases which, to quote the definition with which Liebermeister begins his prefatory essay, "originate through the infection of the system with peculiar poisonous matter." The introduction of a wrong word into a work which is sure to have a large number of readers is always an evil, but in the present instance we may congratulate ourselves that it is not worse, for the authors might have chosen to use the still more objectionable word "zymotic."

Another point which requires notice is, that on some of the subjects the references to recent English literature are strangely defective. Thus, in the essay on cholera, no mention is made of the elaborate reports published during the last four or five years by the Indian Government; nor under the head of vaccination is any reference to be found to the vast fund of

information contained in the Reports of the Medical Department of the Privy Council, or to the elaborate and exhaustive treatise on the subject by Mr. Simon. Perhaps however these conspicuous omissions rather afford evidence that scientific information ought not to be buried in Blue-books, than that German pathologists have failed to use due diligence in expiscating valuable material from the vast masses of waste-paper of similar external appearance by which it is concealed.

Health in India for British Women, and on the Prevention of Disease in Tropical Climates. By Dr. E. J. Tilt. 8vo. London: Churchill.

Dr. Tilt is so well known as an author and authority on women's diseases that it is hardly necessary to say that, as might have been anticipated, his book, though a small one of only 128 pages, contains much valuable and interesting information, and shows that, albeit the author has not had the opportunity of personally studying the subject in India, he has carefully availed himself of the labours of others who have had the advantage—or disadvantage—of such experience.

This, combined with his own large experience of the results of the effects of residence in a tropical climate, as manifested in those who return to Europe, entitle Dr. Tilt to speak with authority, and make the present volume a valuable, though small, supplement to the works on Indian and tropical disease quoted by him. The book contains six chapters, each of which deals with a subject of interest in a very practical and serviceable, though brief manner. After giving an outline of the country, its physical conditions, climate, seasons, respective peculiarities of different localities, and a few general remarks on the diseases of the natives, he proceeds to notice the effect of heat, cold, damp, malaria, of seasons and localities, on the European constitution, especially as regards the female sex. The important subject of infant life and nurture, the question of development in education of the European, and the possibility of colonising India, together with those concerning hygienic measures generally, and other important matters of social and political as well as medical interest, are ably discussed; the remarks on habits of life and means of preserving health as well as of preventing disease are worthy of careful reading.

Space does not admit of extended criticism of the details of this carefully written little volume. It will amply repay perusal, and as affording useful information to whose who are interested in the welfare of our countrywomen in the tropics, it should have a place in every medical library.

Clinic of the Month.

The Treatment of Gout in Surgery.—Sir James Paget, in the course of some clinical lectures delivered at St. Bartholomew's Hospital on the minor signs of gout, pointed out the importance of pain localised in the hands and feet, or special joints of them; of nodular swellings of such joints, and signs of inflammation in them; of contractions of the palmar fascia and its processes. In the treatment of these conditions, in the subacute stage, the joints should be treated with very gentle compression with wet linen and oiled silk, whilst for the relief of the swelling and induration left behind a moderately firm bandage should be used, so as to keep up steadily some amount of pressure on the joints for from two to five weeks after the attack. Apparatuses for extension of contracted fasciæ are rarely well borne, and the division of the tendons, though it has often been practised, almost always fails. Besides the above, other minor signs of gout are neuralgic pains, most commonly situated in the palate, tongue, and breast; hot burning patches in certain parts of the skin; numbness and tingling of a limb or of some portion of one; cramps and "catchings" in over-action. Amongst the affections of the urinary and genital organs are cystitis, orchitis, and prostatic hypertrophy and fibrous thickening or hardening of the penis, though these were not very distinctive features. Sir James also pointed out the relations existing between gout and various forms of disease of the skin, as psoriasis, eczema, urticaria, prurigo, pruritus, &c. These diseases present no special characters in gouty persons, but a knowledge of the existence of a gouty diathesis in their treatment is of much importance. The advice given to out-patients in such cases used to be that they were to take nothing strong, salt, sour, or sweet, which, with some limitations, is sufficiently accurate and good; for the ulcers of the integument which follow collections of urate of soda in the form of chalk stone, the best treatment is water dressing or solution of soda until the deposit is removed, and then, to promote the healing, the application of solution of nitrate of silver. Amongst the minor signs of gout, gouty affection

of the digestive organs may be referred to. Amongst these are a peculiar fur upon the tongue, psoriasis of that organ, elongation of the uvula, and dyspepsia. Lastly, there are some affections of the vascular system, amongst which gouty phlebitis is conspicuous. In regard to the treatment of the gouty condition generally, it must vary with the constitution of the patient in whom it occurs. Colchicum, there can be no doubt, has a remarkable influence on all forms of complete gout, but it is less valuable in incomplete gout, and in those cases of irregular gout that are usually seen in surgical practice. The action of veratrium is more than doubtful. There are three things which have to be considered for all gouty patients. First, the drinking of a certain extra quantity of water, especially in the early morning; those who find an excess of lithates should take some alkaline water instead of plain water whilst dressing in the morning, such as the mineral waters of Vichy or Carlsbad. Secondly, since in gouty patients the skin usually acts inefficiently, recourse should be had to baths, warm in preference to cold, especially in elderly persons; and thirdly, great care and moderation should be exercised in regard to diet. Sir James is not satisfied that spirits are better than wine. The diet should not, at the same time, be too abstemious. (*British Med. Journal*, May 22 and 29, and June 5.)

The Treatment of Primary Disease of the Heart.—Dr. Fothergill, after describing various forms of primary disease of the heart, as aortic and mitral regurgitation, gives the following as the best preventive or palliative measures to be adopted. 1. That it is of the utmost importance in the treatment of primary disease of the heart to reduce to a minimum the calls upon that organ. Consequently, light labour alone must be attempted; and rest in bed is often very desirable at the commencement of a course of treatment as well as at intervals afterwards. 2. Much relief can frequently be afforded when dropsy is present by unloading the distended venous system. Brisk catharsis gives great relief, and does not depress the patient, as might be apprehended. 3. In all cases the heart must be acted upon directly by agents which increase the vigour of the ventricular contractions, of which digitalis is the chief. This agent may be given uninterruptedly for years without any so-called cumulative action, if the cases are properly selected. If given in improper cases unpleasant consequences may follow its administration. 4. It is also very desirable that the nutrition of the heart be maintained by good food and iron, in addition to the means mentioned above. Improvement in the general condition facilitates the action of the special remedies. (*Lancet*, May 29.)

Treatment of Headache from Intracranial Organic Disease.—In the course of a very sparklingly written clinical lecture on the treatment of headache from intracranial organic disease, Dr. Moxon points out the paucity of the literature of the subject in the recent larger works devoted to medicines, and then proceeds to say that all wise practitioners will keep in view two truths: first, that a headache occurring as a thing new and strange to the patient at any time of life needs to be considered with care, lest it be the onset of some acute illness; and secondly, a chronic headache requires good knowledge of the patient's habits of life, so that while endeavouring to bring the excretions into order by appropriate medicines, and with diet and exercise to regulate the daily life into conditions favourable for healthy nutrition, care should be taken that whatever avocation or indulgence is exercising a bad effect, is brought under restraint, directing change of scene, of pursuit, of amusement, according to necessity, and all this without meddling or prying. The recognition of the various kinds of headache obtains its significance only so far as the headache is part of a general condition. The patient is plethoric or dyspeptic, bilious, nervous, hysteric, exhausted, rheumatic, or gouty, and his headache is just that part of his ailment which most obtrudes itself to notice, serving as an introduction to and gauge of his plethora, &c., in accordance with which the treatment must be directed. The headache of organic disease in the cranium is a special type of great importance, and it is of great importance that they should be quickly discerned. Such headache occurring in any person in the earlier decades of adult age, it is imperative that large doses of iodide of potassium should at once be administered. In a large proportion of cases such treatment will save sense, mind, or life. In text-books it is commonly stated that the iodide should be given if the skin signs of syphilis be present, but Dr. Moxon maintains that many, nay most of the persons with organic brain-disease curable by iodide of potassium, not only deny syphilitic history, but show no trace of syphilitic disease of skin or bones. The occurrence of convulsions with the headache is alarming enough at any time, but when associated with the grave and unusual headache above alluded to, ought at once to lead to the iodide being given. Vomiting sometimes occurs in syphilis, and is not accompanied by the foul tongue, flatulence, and full abdomen found in primary gastric disorder. The dose of the iodide should be large. No one is ever hurt by iodide of potassium in doses of a drachm a day. If iodide do not cure, calomel, vapour baths, or immersion should be tried. A point to be noticed is that for the first two or three days of its use the patient sometimes may appear the worse for taking it. When the headache is intense, small doses

of morphia may be injected, but it must be remembered that coma sometimes sets in suddenly. (*Lancet*, May 29.)

Varicocele and its Curative Operation by Subcutaneous Wire Loop.—Mr. Barwell, after describing the characters of varicocele, recommends the following plan of treatment:—First, it is most important that the vas deferens and spermatic artery be separated from the veins. This is best done by the surgeon standing on the patient's left (supposing the disease to be on that side), and taking that half of the scrotum about an inch above the testicle between the left finger and thumb, and feeling for the duct by rubbing the two surfaces of the bag gently together, whilst its walls glide from his grip. When he has thus brought the duct and artery from among the venous plexus, and holds them between his thumb and finger tip, he must let them slip away to the back, so as to separate them entirely from the veins. Supposing this separation accomplished, the bit of scrotum between the finger tips is to be squeezed rather tight, and a needle armed with iron or silver wire, not too fine, thrust straight through above them. The part may now be released from the grasp, and the needle passed in again at the puncture of exit in front of the veins, and out at the first place of entrance. Thus at one opening protrude the two ends of the wire, and at the other a loop: by drawing on the ends the loop is pulled into the scrotal cavity, and closely surrounds the varicocele. Each end is passed through a hole in a piece of wood, and drawn tight enough to make the veins below swell, bulge, and partly consolidate. Every other day, or every day, if time be an object, the wire may be tightened until it has cut through all the consolidated veins and has come away. No suppuration nor apparent inflammation accompanies the process. The patient need not be confined to his bed after the first forty-eight hours. The only caution to be given is that in passing the needle the second time, *i.e.* in front of the veins, its course must be entirely in the cavity of the scrotum, since if some of the living fascia be strangulated in the loop, the case will be considerably retarded, and some amount of suppuration, accompanied by swelling in the walls of the sac, is likely to ensue. The operation is, when well performed, but very slightly painful. (*Lancet*, June 12, 1875.)

Extracts from British and Foreign Journals.

Esmarch's Bloodless Method.—A good paper on this subject, by Dr. Henry Sands, is contained in the *New York Medical Journal*. Though perhaps familiar to many of our readers, we shall reproduce the details as given by Dr. Sands for the benefit of those who may not have had the opportunity of seeing the method practised. The bandages, he says, should be composed of elastic webbing, or, what is better, of simple sheet-rubber, which can be more readily cleaned than the webbing when it has become soiled. The bandages should be about two-and-a-half inches wide, and it is convenient to be provided with several of them, each three yards in length, rather than to employ one long bandage. As a substitute for the tourniquet some surgeons use a piece of the same bandage; others employ a solid rubber cord or rope about a quarter of an inch in diameter, while Esmarch himself recommends for this purpose a piece of tubing made of non-vulcanised rubber, which is softer and more yielding than the other varieties. The application of the bandage in ordinary cases is quite simple. It is put on with moderate compressing force, and carried from the fingers or toes to any desired height. The constricting cord or tube which is to take the place of the tourniquet is then wound two or three times round the limb immediately above the upper edge of the bandage, and made fast either by a knot or by a hook and chain, or any similar contrivance. The bandage is then removed to expose the parts for operation. Some experience is needful to apply the bandage with the proper degree of force. Often it is employed too firmly, and this mistake is pretty sure to be made by beginners. On the other hand, it may be applied too loosely, and Dr. Sands has several times seen it put on with just sufficient force to allow venous congestion of the parts, with consequent hæmorrhage during the operation. The same remark applies with equal truth to the use of the constricting cord, which, if applied too loosely, will cause venous engorgement, and if too tightly, may

do serious damage to the nerves and probably also to the blood-vessels of the limb. The skin, when exposed after the removal of the bandage, is seen to be blanched and anæmic, and when the deeper tissues are cut into, they are found to be nearly or quite bloodless. The vessels, both arterial and venous, are almost absolutely empty, so that an amputation of the thigh can be performed without the loss of more than five or ten drops of blood. As soon as the constricting band is removed, the large vessels having been previously secured, the blood returns to the part with considerable force, and a pretty free oozing commonly takes place. This is usually quickly checked by the use of cold water, aided, if necessary, by gentle pressure. With slight modification in the adaptation of the apparatus, the method may be applied to amputation at the hip or the shoulder-joint. The advantages claimed for the bloodless method are, that it is sometimes the direct means of saving life by economising the vital fluid; that it renders the healing process more certain and speedy; that it diminishes the frequency of septicæmia and pyæmia; that it enables the surgeon to accomplish deep and difficult dissections, the tissues not being obscured by blood; that it permits the easy extraction of foreign bodies and the thorough examination of diseased bones and joints. The objections made to its use are, that the pressure impairs the vitality of the parts and causes them in many instances to slough; that it sometimes affects injuriously the nerve-trunks, giving rise to paralysis both of sensation and motion; that it may induce plethora of the internal organs; and lastly, that in cases of gangrene or unhealthy suppuration, poisonous fluids may be passed into the blood-vessels or into the healthy tissues by the bandage, and thus occasion septicæmia or pyæmia. Dr. Sands proceeds to give the details of 143 cases of operation, of which 63 were amputations. Of these last, 10 cases terminated fatally, or 22·7 per cent. Four died from pyæmia, three from exhaustion or shock, one from spreading gangrene, one from erysipelas, and one from hæmorrhage. Dr. Sands' conclusions are highly favourable to Esmarch's plan, though he thinks the method will not prevent pyæmia, whilst care should be taken when dissections are made that large vessels are not divided. (*New York Medical Journal*, No. 1, 1875.)

Periostitis of the Temporal Bone complicating Purulent Otitis.—Dr. Duplay observes that when, in the course of an acute or chronic purulent otitis, pain, swelling, and redness of the peri-auricular and mastoid region supervene, we at once suspect that a grave complication has arisen, and we fear that suppuration of the mastoid cells has occurred. Under appropriate treatment, these symptoms may all gradually disappear

and resolution take place, or the inflammation may proceed to suppuration, from which, after the spontaneous or artificial evacuation of the matter from the mastoid cells, the patient may make a good recovery. The cases to which he desires to draw attention are those of external periostitis over the mastoid process, which he thinks is not sufficiently known. In his experience it supervenes almost exclusively in the course of purulent catarrh of the tympanum, with more or less extensive destruction of the membrana tympani and implication of the meatus auditorius osseus, or part corresponding to it in the new-born infant. The treatment should consist in making a very free opening as soon as the presence of matter can be satisfactorily determined. (*Archives Générales de Médecine*, May 1875.)

The Fluids contained in Hydrocele of the Tunica Vaginalis.—Dr. Méhu divides pathological collections of fluid into two groups: *serous liquids*, which correspond to those of acute pleurisy, hydrothorax, ascites, hydrocele of the tunica vaginalis, certain fluid collections in the subcutaneous cellular tissue resulting from contusions, hydrarthrosis of the knee-joint, and hygroma. These fluids are of a yellowish tint in general, and are all rich in albuminous matters. The second group comprises the *seroid liquids*, as the cephalo-rachidian fluid, the contents of hydatid cysts, encysted hydrocele of the cord and of the epididymis. These differ *inter se* more than the former group. Some are sharply distinguished by containing some special morphological element, as echinococci or spermatozoa; they are usually colourless or slightly milky, without fibrin or albumen, or with but traces of them. The constituents of the liquids of the *tunica vaginalis* are identical with those of the serum of the blood, though the solid residue after evaporation is somewhat greater. They are usually limpid, even when they contain a large proportion of albumen. They filter easily, owing to the absence of fibrin. He twice, however, observed them to coagulate after removal from the body. They occasionally contain cholesterin. The liquids of hydrocele of the tunica vaginalis are never colourless, but have always a more or less amber or orange, deepening into icteric green tint; but the liquids of encysted hydrocele of the epididymis are neither yellow nor green, but present the aspect of water to which a few drops of milk have been added. They contain myriads of spermatozoa. They are alkaline to test paper. Dr. Méhu gives the details of the analyses he has made on a large number of cases of the fluids contained in both the above varieties of hydrocele. (*Archives Générales de Médecine*, May 1875.)

The Course of the Temperature in Defervescence.—Dr. Finlayson remarks that the observation of the temperature in cases in actual practice affords charts that are widely different from those that are given in books, taken from typical cases, and that it is difficult to draw conclusions from them; and he proceeds to consider an ideal case in which the practitioner is anxiously watching the course of a febrile disease when a crisis is expected, or when defervescence may seem to have begun, and to consider what fallacies may present themselves. In the first place, so long as the febrile temperature persists the disease continues; but a fall of the temperature is *not* necessarily a favourable prognosis. In the case, for example, of basilar meningitis, the temperature is seldom very much elevated, and a marked diminution from the previous heights of a *tubercular fever* may sometimes be seen when the cerebral symptoms begin to assume a special gravity; so that whilst a too exclusive reliance on the indications of the thermometer might lead to a favourable opinion being given in regard to the actual condition of the patient, the depression of temperature might really be due to the failure of the vital powers. In *pneumonia*, again, although the usual course of a fatal case is to attain a maximum before the termination in death, there may be exceptionally a low temperature preceding this event, either continuing to the end or giving way to a terminal exacerbation. A depression of the temperature to the degree of collapse may be associated with severe intestinal hæmorrhage in *enteric fever*, or possibly even with perforation of the bowel, and this depression may perhaps be the earliest of such accidents. A great depression may likewise follow *other forms of bleeding*, remedial or otherwise, and it is sometimes associated with the act of *vomiting*, or with a profuse *discharge from the bowels*. A collapse temperature may, however, be of no evil omen, and may constitute one of those critical perturbations which not unfrequently pave the way for a genuine crisis within twenty-four or forty-eight hours. The best means of avoiding being led into such errors are: (1) By paying careful attention to the state of the pulse and the general condition of the patient; and (2) By acquiring familiarity with the usual course and the common deviations of the temperature in special diseases. The sudden rise and fall of the temperature in an ague, or in the course of a few days in relapsing fever, may bear a superficial resemblance to the alternations in the pyrexia of pyæmia without possessing anything of the gravity of this fatal disease. Hence a fall of temperature immediately after observations have been commenced must be interpreted with caution. Dr. Finlayson gives instances of the differences in the rapidity of the fall of temperature in the crisis and lysis of various affections, it being usually sudden in the former, and slower and

more steady in the latter. The temperature of convalescents is unstable, and when relapses or complications are feared, the evening observations should be continued. (*Glasgow Medical Journal*, April 1875.)

Some Facts concerning Pneumonia.—Dr. W. B. Rodman has recently had the opportunity of treating in the Kentucky State Prison Hospital a large number of cases of pneumonia, which he attributes to the bad ventilation of the "cell-house," in which 700 men sleep in cells that only contain about 300 cubic feet of air each. The mortality was 6 in 75 cases, or 8 per cent., but since using a particular plan of treatment he has had no death in 23 cases. The treatment adopted in ordinary cases was as follows:—On the patient presenting himself he was thoroughly bathed with warm water and a mustard emetic given. The bowels, if constipated, were moved with some saline, generally magnes. sulph. and potass. bitart. The whole of the affected lung or lungs, as the case might be, was enveloped in a turpentine stupe, which was kept on till the second stage began. Warm moist applications were now made, as of woollen cloths wrung out of hot mustard and water. As soon as the bowels were opened, carbonate of ammonia in fifteen-grain doses was given in mucilage of acacia every three hours, with three grains of quinine with each dose. From the beginning the diet was most liberal, consisting of beef-tea, milk, eggs, &c. As soon as the second stage had set in whiskey was added to the above, sometimes as much as a pint and a half or a quart being administered in the twenty-four hours. The carbonate of ammonia and quinine were kept up till resolution was fully established. Opium was rarely given, especially in the later stages. When the bronchia were tolerably free, ten grains of Dover's powder were given at night. Blisters were not often used, but when the dulness was persistent they often proved very serviceable. Such was the treatment of ordinary cases. When the temperature was as high as 104° or 105° F., occasionally 106·5° (with ultimate recovery), quinine was given in large doses to obtain its antipyretic effect (10 and 15 grains). When this was insufficient, the wet pack was used to assist in abating the fever. Niemeyer's plan of cold-water treatment was tried, but with unsatisfactory results. Towards the later stages, if the pulse became weak and frequent (showing a weakened action of the heart from exhaustion), digitalis was used with good effect. Dr. Rodman frequently found it beneficial, when well-marked typhoid symptoms were present, to administer a solution of potassium chlorate and of the perchloride of iron tincture in combination with the above, the doses being 5 grs. of potass. chlorate and ℥ 30 of tr. fer. sesquichl.

every four hours. Dr. Rodman insists particularly on the value of carbonate of ammonia used from the *very beginning* of the attack, though he is unable to explain how it acts. (*Medical Record*, No. 227, 1875.)

Serpiginous and Phagedænic Ulceration, and Quinine.—Mr. Croft calls attention to the value of quinine in these forms of disease. In one case, of which full details are given, where serpiginous ulcers of syphilitic origin had long existed, iodide of potassium had been prescribed at various times in full doses. Mercurials had also been given internally in the form of the biniodide. Calomel vapour baths and topical fumigation had severally been employed without effect. Twice fuming nitric acid was applied without benefit. At length quinine in eight-grain doses was combined with scruple doses of iodide of potassium, and from this time a remarkably rapid cure commenced. In twenty-eight days he was able to walk out of the hospital to go to a convalescent hospital. No relapse took place. The eight-grain doses caused singing in the ears about one week after he had commenced to take the medicine; but it was not discontinued on that account. Mr. Croft gives two remarkable cases of phagedænic ulceration, one of which was syphilitic and the other non-syphilitic, in which quinine proved extremely useful. (*St. Thomas's Hospital Reports*, vol. v. 1875.)

Report on Cases of Pneumonia.—Dr. Peacock, of St. Thomas's Hospital, gives an interesting analysis of 100 cases of idiopathic pneumonia which he has treated in public practice. Of these, 30 were treated at the Royal Free Hospital, and 70 at St. Thomas's; 81 of the cases were men, and 19 women, which he shows corresponds closely with the results of other observers. The greater tendency to pneumonia in men is simply due to their exposure to the exciting causes of the disease. Pneumonia chiefly occurs in the periods of youth and middle age, when the system is most vigorous and the liability to exposure the greatest. Most of Dr. Peacock's patients followed laborious out-door occupations. The numbers were greatest in spring and summer, pointing to the production of the disease by sudden alternations of temperature and chills occurring in warm weather, when the functions of the skin are active, rather than by exposure to severe though more continuous cold. The duration of illness before the admission was in general only a few days, and the disease usually commenced with rigors or chills, followed by heat and pain, cough and expectoration; sometimes it supervened on ordinary catarrh. The right side was affected in 23, the left in 25, and both sides in 36 cases, the remainder not being named. The complications were, amongst others, haemoptysis, delirium and otitis, capillary

bronchitis and commencing phthisis, scorbutus, pericarditis, endocarditis, phlebitis, rheumatism and delirium, anasarca, jaundice, curvature of the spine, diarrhœa, herpetic eruptions. The temperature, though high, rarely exceeded 104° Fahr. It ranged from 99·3 to 104·5, and the highest temperature occurred in the first week. The mean period of residence in the hospital was at St. Thomas's, 35·5 days; in the Royal Free, 25·3 days. The deaths in all the cases were 11·7 per cent., or one death in 8·5 cases. In regard to treatment, in some, limited bleeding or cuppings were practised, and small doses of calomel, or grey powder, with opium or Dover's powder, were given internally. In others the treatment was rather of an eliminant and expectant character. Bicarbonate of potash, acetate of ammonia, and nitric ether were given, and with these were combined expectorants and anodynes, ipecacuanha, opium, or hyoscyamus. In both series of cases, stimulants—ammonia, brandy, or wine —were ordered when the patient's strength began to fail, and blisters, sinapisms, or poultices were applied externally. (*St. Thomas's Hospital Reports,* vol. v. 1875.)

A Pathognomonic Symptom of the Moribund Condition.—Dr. John Shrady, in a paper upon the "Moribund Condition," recently read before the Yorkville Medical Association, maintained that the earliest and therefore most valuable symptom of approaching death was the up-and-down movement of the trachea; that the inferior laryngeal nerve, owing to a partial paralysis or impairment of its function, is concerned in the production of this phenomenon, and sounds the first note of alarm that the medulla oblongata is invaded. This tracheal symptom is particularly prominent in fatal cases of uræmic convulsions, opium poisoning, apoplexy, and delirium tremens; the air then ceases to stimulate the glottis, the respiratory movements are impaired, and the lungs can no longer decarbonise the blood. In pneumonia, Dr. Shrady thinks this symptom is of special value, anticipating as it does alarming changes in pulse and temperature, whilst in phthisis he has known it to be a precursor of death three weeks in advance. Its presence or absence in membranous croup should, in his opinion, be an important element in the prognosis of a given case of tracheotomy. (*Medical Record,* No. 230, 1875.)

General Treatment of Chronic Nervous Diseases.—Prof. Benedikt remarks that in addition to electrical treatment, thermic and hydrotherapeutic treatment play an important part in the cure of these affections. Acute inflammation, producing trophic disturbances by exudation, requires when they have passed into the chronic stage, the application of heat in those forms which promote absorption, as warm and even hot

baths. Chronic and progressive forms of inflammation, with hypertrophy of connective tissue, require hydrotherapeutic means. In chronic neuritis, as seen in muscular atrophy, tabes, &c., on the other hand, warm baths are injurious, and are at least incapable of arresting the progress of these diseases. In the stationary condition, however, they may prove serviceable. Hot baths are indicated in the treatment of the sequelæ of the acute and subacute inflammation of the central nervous system and of the membranes, providing they exhibit no tendency to progress; but they are contra-indicated when the neuralgia, anæsthesia, and paralysis increases, or where the brain and spinal cord are congested. If given at all, the intervals between them should be considerable and the patient should be put to bed at once, so that he is exposed as little to the air as possible. In peripheral neuralgiæ, which Benedikt regards as always depending upon neuritis and its consequences, the decision as to whether thermo- or hydro-therapeutic measures should be adopted is much more important than in central neuralgiæ; for in many instances the peripheral neuralgiæ originate in rheumatic conditions, in which the application of cold would act injuriously. In peripheral rheumatism, vapour baths, with electricity and judicious exercise, constitute the most advantageous method of treatment. Cases of hæmorrhage in the central nervous system require special precaution, for these are not, in the majority of cases, a local disease, but the expression of widespread atheromatous or varicose changes in the brain. In some of these cases all active treatment is contra-indicated; but in most cases the use of warm but not of hot baths is serviceable, providing there are no indications of motorial irritation, as contractions and convulsions. The presence of contractions, however, is not in itself a contra-indication to thermic treatment; and although they are rarely cured, yet they may be improved. Thermic and electrical treatment together should only be undertaken with great precaution, and sometimes not until six months from the date of the attack. Hydrotherapeutic procedures are only of service in relatively recent cases, and only when thermic methods of cure are of no advantage. Little is known in regard to the treatment of psychosis by the application of heat. The application of cooling measures in the mode adopted in febrile cases is very satisfactory in acute nymphomania, and may even preserve life. In chronic cases of dementia paralytica the methodical application of the cold water cure proves at least of temporary benefit; but the results of this plan of treatment are best in melancholia attonita. In all these forms of disease the thermic procedure constitutes a powerful agency for good, and the same may be said of the group of symptoms produced by neoplastic formations and idiopathic epilepsy. The cold

water cure proves serviceable in hypochondriacal cases in consequence of its tonic action. In spermatorrhœa and impotence, in addition to the electric, thermic treatment is indicated, especially with powerful douches, though it must be used with care, since it sometimes proves injurious. Specialists have a high opinion of the effect of douches applied to the back of the head. Amongst local thermic measures, Chapman's application of heat and cold by tubes of india-rubber to the spinal column deserves special praise, the principle of which is that the temperature of the extremities and of the head stands in relation to the congested or anæmic condition of certain regions of the spinal cord. As a rule, no extreme temperature need be applied. Amongst the means of promoting resorption, electricity and warmth occupy a high position, and to them may be added iodine and quicksilver, which, applied coincidently, often effect remarkable cures, as is especially seen in cases of neuro-retinitis. Neither iodine nor mercury, however, are of much service in the chronic progressive forms of inflammation of the central nervous system, though they are particularly useful in the recent forms after hæmorrhages and in neoplasms. No distinction need be drawn as to whether the neoplastic formation is of a syphilitic or non-syphilitic nature. Narcotics and nervines are useful, and morphia and chloral as anæsthetics. In chronic nervous disease, both of these last should be avoided as far as possible, since the system soon becomes habituated to their use. When cerebral disturbances of the circulation are present, chloral is a very dangerous remedy. Atropine and belladonna are amongst the most valuable of the nervines, especially in spastic conditions. *Amyl nitrite* may best be applied as an odorous drug, mingled with double its weight of ol. fœniculi, in asthmatic and steno-cardiac cases, in epileptic faintness accompanied by pallor, and in migraine also, when they commence with paleness of the face. *Bromide of potassium* lowers the reflex excitability of the nervous system, and is therefore particularly useful in epilepsy. It is also a calmative in states of excitation, when not too intense, in sleeplessness not caused by pain, as in young children, and in melancholic states. It often acts well in neuralgic conditions, but large doses are required. It may be advantageously combined with iron. *Nitrate of silver* is especially useful in inflammatory conditions of the central nervous system and in epilepsy, but must not be pushed too far. *Zinc preparations* are serviceable in spastic conditions and in hysteria. Muscular gymnastics play an important part in the treatment of anæsthesia of the joints, muscles, and tendons after chills. Benedikt does not go quite so far as Griesinger in interdicting smoking, but acknowledges it is harmful in excess. The food, in conditions of nervous disease arising from irritation, should be mild; hence

has arisen the milk cure and the cures effected on exclusively vegetable diet. The dry cure is especially adapted for gastric diseases, as in dilatation of the stomach. Lastly, changes of air and scene and mental and moral influences are very important means of cure. (*Medicinisch Chirurgische Rundschau*, Feb. 1875.)

Contributions to the Pathology of Diphtheria.—Dr. Jacobi does not regard croup and diphtheria as independent diseases, but considers that only such differences exist between them as usually prevail between the sporadic and epidemic forms of the same disease. The membrane is an essentially epithelial product, and the peculiar granular amorphous material considered by Oertel and others to be the essential element of the disease is believed by Jacobi to consist of detritus and fat molecules, which are the products of the degeneration of the epithelial cells. He does not attribute much importance to the bacteria said to be present. The anatomical characters and peculiarities of the part affected have, he thinks, much to do with the more or less deep penetration of the disease into the subjacent tissue and the relative difficulty of its cure. The parts covered with pavement epithelium are most likely to be attacked with diphtheritic inflammation. Hence the tonsils and surface of the vocal cords are especially liable to be attacked.—(*American Journal of the Arts*, Feb. 1875.)

Treatment of Purpura Hæmorrhagica by hypodermic injections of Ergotine.—Dr. Angelo Cianciosi has obtained excellent results from hypodermic injections of ergotine in a case of purpura hæmorrhagica. The patient was a child of six years of age, of good constitution, who had up to that time never had any illness, but had occasionally suffered from gastro-intestinal disturbance. The parents were perfectly healthy. One evening this child was suddenly attacked with intense headache and fever. An hour afterwards free hæmorrhage took place from the nose and mouth. The hæmorrhage recurred four or five times in the course of the night, lasting ten or twelve minutes on each occasion. The loss of blood continued on the following morning. Spots the size of the head of a pin and of a bean appeared on the mucous membrane of the mouth, and others more confluent and of various sizes on the trunk and limbs. The spots did raise the skin and did not disappear on pressure; they formed ecchymotic patches on the left shoulder which resembled a bruise. The cardiac pulsations became very feeble, the strength diminished, and it became requisite to apply some remedy to arrest the repeated hæmorrhage. With this object in view, gallic acid in large doses was prescribed, and the hæmorrhage soon stopped; but five or six hours afterwards it recurred with great violence, the patient becoming quickly greatly depressed.

Under these circumstances Dr. Cianciosi decided to try the effects of hypodermic injections of ergotine, with an interval of an hour and a half between each. The first was made in the deltoid region, the second in the shoulder. After the third the hæmorrhage was arrested and did not re-appear, and recovery soon took place. (*L'Independente*, March 1875.)

Therapeutical Effects of Oxygen.—M. Tamin-Despalle, in a paper read before the Académie des Sciences, states that on the 18th April, about 2 P.M., M. L. was attacked with severe cerebral congestion. He fell, and on recovering himself found that the whole of the right half of the body was paralysed. The pulse was 82; the face was livid, and the stomach contained a considerable quantity of food. He had breakfasted about half an hour previously. M Tamin-Despalle thought he ought not to bleed, to apply leeches, nor to administer an emetic. He ordered inhalations of pure oxygen. After the first few inspirations M. L. declared that he felt better, and the power of motion and sensibility returned in the paralysed side. At 6 P.M. some shivering occurred with an abundant discharge of urine and strong eructations. At 7 P.M., having consumed in all about eight quarts of pure oxygen, he was well. (*Gazette Médicale de Paris*, 1875, p. 229.)

Diagnosis and Treatment of Neuralgia.—V. Pitha calls attention to the great frequency of neuralgia, which he attributes to the increase of morbid excitability of the nervous system of the whole of the present generation. Neuralgia occurs at all ages, in both sexes and in every condition of life, especially in those of a nervous temperament. Hereditary predisposition can often be demonstrated. The proximate causes are often strains of the body, chills, injuries. V. Pitha himself has suffered for two years from the most severe neuralgia, in consequence of an accidental wound in an operation, and his account of his own case contains many points of interest. In particular he dwells upon the vagaries of the imagination in this affection, and states that he was perfectly convinced he had a stone in the bladder, the irritation of the projecting spiculæ as well as the blows of the stone against the mucous lining of the viscus being distinctly felt; and he was only satisfied of the incorrectness of his opinion after the bladder had been carefully searched with a sound. From that moment all the sensations vanished. From observations on himself and others, he believes the subcutaneous injection of morphia to be the most satisfactory mode of administering it, since it operates quickly, and the narcosis is slight compared with the great diminution of pain that is effected; moreover, it may be frequently repeated without injurious effects. The smallest effective doses should be commenced with, and these

should only be increased when absolutely requisite. He gives a caution against employing morphia in those who have disease of the heart, as it sometimes produces in them deadly pallor, cold sweats, &c. When the toxic influence of morphia is manifested, he recommends energetic walking in the open air, washing of the skin with vinegar, clysters of strong coffee, and, in extreme cases, artificial respiration. As a remedy preventing the unpleasant after-effects of morphia on the stomach and intestinal canal, V. Pitha recommends hydrochlorate of quinine, or a minute proportion (100th of a grain) of atropin may be added to the injection fluid. (*Allgemeine Wiener Med. Zeitung*, 1875, No. 1.)

Treatment of Foreign Bodies in the Œsophagus.—Krishaber, in a case where a patient was suffering from the presence of a foreign body in the œsophagus, directed him to drink a large quantity of water. He then introduced a long whalebone sound armed with a dry sponge into the stomach, where he allowed it to remain till it had greatly increased in size by imbibition. He then slowly withdrew it, and thus swept the œsophagus from below upwards. A portion of bone was by this means withdrawn. M. Duplay, in commenting upon the case, observed that it would be difficult to fill the stomach with water if the patient could not swallow, and that if the sponge swelled too much its withdrawal would be painful. (*Séance de la Soc. de Chirurgie*, and *Centralblatt für die Chirurgie*, No. 16, 1875.)

Ergotine in Croupous Pneumonia.—The well-known contractile influence of ergot upon the vessels—shown by the anæmia of the invisible mucous membranes—led Dr. Wyeisk (*Allg. Med. Central Zeitung*) to employ it in six cases of croupous pneumonia, and the results were very favourable. In one such case, with profuse serous and albuminous expectoration, the latter ceased entirely within two hours after the administration of the ergot of rye in powder, and the coarse rattling râles in both lungs gave way to the fine crepitation heard in the early stages of the disease. This effect lasted for two days, and on a second and even third return of the expectoration the ergot was administered with the same good results. None of the other five cases of pneumonia in which the ergot was employed terminated fatally, no sequela occurred in any; the effect of the ergot in all was to diminish the amount of the exudation and consequently the expectoration. The doctor, however, would not advise the use of ergot in large infiltrations, in emphysema, in cases of rupture of cerebral vessels, or in exhausted and decrepit individuals, as it might in such cases prove hazardous. (*New Remedies*, vol. iv. No. 2, p. 103.)

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Department of Public Health.

THE IRISH FAMINE AND ITS RESULTS.[1]

[THE following article is reprinted from the *Times* of the 20th February, 1875. It tells the story of the great Irish Famine of 1846–47. Many will remember that awful calamity and the pestilential typhus which followed upon it; but very few, we apprehend, will have any just conception of the social conditions which made the famine possible, and of the social results which have arisen from it. It is a great gain to the student of contemporary history to have the story of the famine and of its results related by a writer possessing the rare mastery of facts perspicuity of judgment, and felicity of language manifested in this article. To the student of public health the article is of especial interest as furnishing a remarkable study of questions which so intimately concern him in relation to social and political conditions. We quote the article without curtailment.]

The great Irish Famine of 1846–47 fills a gloomy page in our national annals. This wide-spreading calamity was marked by scenes of appalling suffering, and will ever stand out as a tragic passage in a long history of many misfortunes. As always happens, too, in great social crises, it brought out in its most striking aspects the good and evil of human nature, and it exhibited in a pathetic drama contemplated by the civilised world the extremes of endurance and resignation, immense benevolence and far-reaching sympathy, alternating with mere callous selfishness and indifference to moral claims and duties. Yet, memorable as the visitation was, its results have been even more important, and the lessons it teaches even more instructive. Like the storm which clears and sets free while it ravages, the desolating trial of thirty years ago smote at once the whole social fabric of Ireland, and opened it to improving influences; and a brief season of cruel affliction has been a turning point in the national life from which we may

[1] "The History of the Great Irish Famine of 1847." By the Rev. John O'Rourke, P.P. Dublin, 1875.

trace new growth and advancement. The events of 1846–47 relieved Ireland from a dead-weight of misery that seemed almost to forbid her progress; they produced a train of noble reforms by concentrating the attention of statesmen on the peccant parts of her distempered frame; and, in a word, the felicitous change which, in our days, has passed over the country must, in a great measure, be ascribed to them. Nor were the consequences of this troubled time confined to the land which, in the first instance, was the theatre of its most woeful incidents. The Empire owes to the distress of Ireland the rapid accomplishment of free trade, with effects extending throughout the globe; and the emigration of the Irish millions which has gone on during this generation has had a direct and most potent influence on the fortunes of the American Commonwealth and of other divisions of the human family. Looking at the subject, too, from another point of view, impartial history will, we believe, record that the efforts made by the British Government to mitigate and cope with the awful calamity under which Ireland, for a time, collapsed, were on the whole worthy of a great State; and it signally attests the enormous difficulties of rulers in such a position of affairs, and the expediency, in times of national dearth, of keeping steadily in sight the maxims of sound sense and political science, and deviating from them as little as possible. For all these reasons we shall briefly retrace the vicissitudes of the Irish Famine; but if we select this work as a text, our commentary will differ widely from it, nor can we in any respect commend it. We do not say, indeed, that Mr. O'Rourke is not a laborious and patient compiler, and he has put together a variety of details, which, though not effectively grouped and arranged, are of real use to a student of the time, and throw a good deal of light on his subject. But his book is pervaded from first to last with what we can only describe as a spirit of passionate hatred of England; and he is so ignorant of the elementary knowledge required even to comprehend his theme, and so blinded by the false belief—too common, we regret to say, in Ireland—that the State must be looked to to do everything, that his conclusions are almost always unsound, and his views too often absurd or distorted. What, in fact, can be said in behalf of a writer who insinuates that British law and government were the cause of the misery of 1847; who contends that Parliament had the power of turning want into ease and plenty; who thinks legislative quackery a surer means of supplying the needs of a distressed people than the energies of unrestricted commerce; and who alike makes no allowance for the trying position of an Administration at a tremendous crisis, and persistently represents its untiring efforts to assuage suffering and avert famine as pedantic blundering or selfish indifference?

The Famine of 1846–7 was only the last of many calamities of a similar kind that had passed over Ireland. The gorgeous cloudland of mythic tradition high-piled by the imagination of the Celt is diversified by numerous spots of gloom denoting seasons of extreme dearth; and the earliest authentic records show that the aboriginal Irish were often exposed to scarcity and its attendant evils. Each century of Norman rule in Ireland is marked by the traces of cruel famines, and the sufferings of the people must have been terrible in a land convulsed by the strife of races, where Feudalism wore its most repulsive aspect. The horrors of the years of want and wretchedness, which followed the close of the Desmond wars, are commemorated by the pen of Spenser; and his vivid picture of the "anatomies of death, eating carrion, and crying like ghosts from their graves," brings home to the mind a fearful impression of the state of the peasantry at this period. The invasion of Cromwell inaugurated an era of appalling dearth, in which "the people," it was said, "lived like brute beasts;" and the father of medicine gave the name of the "Irish dysentery" to the consuming disease which

soon afterwards swept over the country and made its destructive way into England. The effects of the wars of William III. seem to have been in many respects similar; and famine and pestilence, it is thought, struck down nearly third of the native Irish race in the second half of the 17th century. The first really trustworthy account, however, of a period of general want in Ireland, in an age of anything like order, is that of the great Famine of 1739–41, which presented scenes in many particulars resembling those of 1846–7. At this time the land system of Ireland had begun to assume the peculiar form which it finally took many years afterwards, though it had not attained its full development. An increasing population spread over the soil, eking out life on a precarious root, and ruled over by an alien caste; and the great body of the Celtic peasantry were continually on the verge of extreme scarcity. In this state of things, it is said the potato was blighted in a week by a severe frost; and before long want and its companion, disease, were doing their deadly work through the affrighted country. The misery of the two succeeding years is attested in many publications of the day, and as a Poor Law for Ireland was not yet dreamt of, and no attempt was made to organise relief, we can readily believe that of a population then numbering about 2,000,000 persons, not less than 400,000 perished. One circumstance draws a broad distinction between this famine and that of our age. The Irish Parliament made no effort to mitigate distress even by taxing property; and, as a necessary result, the visitation of 1740 was infinitely more destructive than that of 1847, though the last was a much more searching trial. During the eighty years that followed 1740 there were many seasons of dearth in Ireland, and, in all these instances, the cause was the same, the partial failure of the untrustworthy root, which fed the swelling millions of the Irish peasantry, and placed them at the lowest level of existence. Yet during this period no earnest attempt was made to improve this state of society, and, in fact, all that was worst in it had gone on increasing with dread rapidity.

A variety of causes had promoted to an extraordinary degree the growth of the population of Ireland, and the evil results, perhaps, more than balanced all the good effected in the meantime by liberal reforms and improved government. By 1820 Protestant ascendency and landlordism had been in part restrained; but the 2,000,000 of three generations before had multiplied into nearly 7,000,000, and two-thirds of this mass of humanity depended for life upon the potato, and was rapidly gravitating towards want and wretchedness. It is but fair to say that this state of things was a legacy of the Irish Parliament; but it is to be regretted that twenty years after the Union it had continued unchanged, or perhaps had gradually changed for the worse; and the chief reproach that can be justly urged against our Irish rule in those days was that statesmen were not sufficiently alive to the immensity and the imminence of the peril. In 1822 a faint prelude was seen in Ireland of the catastrophe of the next generation. In the preceding harvest the potato had failed in several parts of Munster and Connaught, and considerable districts in the south and west were plunged for some months into very great misery. The distress, however, was only partial; and though no Poor Law as yet existed, it was lessened by charity and Government grants, the Imperial Legislature having in this respect acted very differently from its Irish prototype. Fourteen years having passed, the frightful evils of Irish poverty, in its extending growth, attracted the attention of the heads of the State, and the Government of Lord Melbourne made a real attempt to deal with the worst of Irish difficulties by the inauguration of the Irish Poor Law. This system, however, was only developed very slowly; its introduction was, in fact, difficult in a country swarming with a pauper peasantry, and was actually opposed by Irish agitators, and even as late as

1844 it was merely in its immature infancy and was wholly unequal to meet an emergency. By this time the state of affairs which had been in progress for years in Ireland had, at last, reached its complete proportions, and experience was soon to show how terrible were the evils which lay concealed within it. In 1844 the population had acquired an Asiatic density; it numbered more than 8,000,000 souls, and though the country had increased in wealth and numerous signs of progress were seen, especially in Ulster and parts of Leinster, still the immense majority of the overcrowded peasantry were mere struggling and impoverished serfs; and it had been ascertained that of the Irish community not less than 2,500,000 persons were continually on the brink of starvation, preying on the country like a devouring incubus. Society, in this condition of things, was, it was said with equal terseness and truth, based on the potato and nothing else; it was this, in fact, alone which enabled millions of petty occupiers to maintain life on infinitely sub-divided patches of land; it was this alone which fed an enormous mass of vagrant beggary, to be seen everywhere; and it formed, so to speak, the main element of rent, of wages, and even of currency. To complete the picture it must be added that Ireland was, to a large extent, possessed by needy and bankrupt landlords, in race and faith cut off from the people, divided from them in thousands of cases by the intricacies of a barbarous mode of tenure, and often without the inclination or the means to improve their estates or to raise their dependants. Thus, notwithstanding some marks of advancement, the island, even in its normal condition, was ever, so to speak, on the border of an abyss; and the frame of society, disordered throughout, exhibited its ills in widespread wretchedness, in divisions of class, and in chronic disturbance. What would be the issue should a sudden calamity destroy the frail and treacherous root on which this whole order of things was based?

This consummation was now at hand, with far-spreading and permanent results. In the autumn of 1845 the potato was attacked by a mysterious disease, and before long a cry rose from Ireland that the people were in the grasp of famine. The great Minister who was then in power acted with remarkable promptitude and vigour. Having ascertained that a large part of the potato crop was unfit for food, he made up his mind to repeal the Corn Laws; and, in order to secure the means of existence in the most remote and distressed districts, he purchased a supply of Indian corn, which was secretly stored in Government depots, and set on foot a system of public works sustained wholly by grants from the Treasury. Whether these last measures of Sir R. Peel were altogether politic admits of question; but, though they involved a large expenditure, they were not put to a very severe test, for as the failure of the potato in 1845 was not so general as had been feared, and the yield of cereals was very prolific, want in Ireland in that year was not excessive. What, however, was in 1845 but the foreshadowing of approaching evil became in a few months a tremendous reality. In the second week of August, 1846, the potato was blighted throughout Ireland; and the effect equalled all that has ever been heard of the devastating march of the tropical blast or the ravages of the locust tempest. The plant seemed struck by some malign influence; in a few hours its gay summer blossoms and rich leaves shrivelled up and putrified, and far and near, in all parts of the island, the vast green spaces which marked its presence became desolate breadths of noisome decay, standing out ominously in the bright harvest landscape. Those who beheld the sight will never forget it; and the aspect of the peasantry, who almost everywhere showed they felt a dread visitation was near, gave the spectacle a touching human interest. By this time Sir R. Peel had resigned, and the Government of Lord Russell addressed itself to meet an evidently impending crisis. The measures of the Cabinet were,

in some respects, most wise; and, even if misled by recent experience it possibly underrated the approaching peril, it is most unjust to judge too severely the acts of statesmen at such a conjuncture. As it was at least doubtful whether the late purchase of Indian corn by Sir R. Peel was not contrary to sound principle, the Government of Lord Russell properly resolved to trust in the main to the powers of commerce for the general relief of Irish distress; and it declared that it would not interfere with trade in the importation of food into Ireland, and that, even as regards the internal trade, it would interfere as little as possible. At the same time, as whole tracts of the island were almost devoid of retail traffic, and especially of that in corn and provisions—the potato having been the whole support of life—it determined to establish State depots in certain places with supplies of food, directing, however, that these resources should be distributed only where want was extreme, and that they should not be sold under the market price, in order to avoid the great mischief of banishing or keeping away the ordinary dealer. The question, however, was one not of food only, but of finding means for an unknown number of impoverished human beings to procure it: for destitution, it was known, would be great, and the Poor Law system was not yet sufficiently developed to rely wholly on it. In this position Lord Russell turned to the expedient adopted by his predecessor, providing, however, for its extension, and at least taking some obvious precautions. Public Works, presented by Local Boards, were to be executed in distressed districts; and those considered entitled to relief by committees acting upon the spot were to be set to labour at these constructions and to be paid accordingly in money wages. The Treasury, which from the very outset was liberally opened to assist Ireland, was in the first instance to pay for everything; but half the charge was ultimately to fall upon the land, in order to check mere waste and extravagance. The Irish Board of Works was entrusted with the superintendence of this scheme of relief, and the Cabinet entertained hopes that private enterprise would largely supplement and supersede in a great measure the immense system of artificial labour established to meet the sudden emergency.

Meanwhile the shadows of an awful cloud had been gathering over the devoted land which had been the object of this solicitude. Five-sixths of the potato crop at least perished; the oats, too, the crop next in importance to the Irish peasantry, largely failed; and, before autumn had closed, it had become too evident that a season of frightful dearth had set in. For a few weeks the mass of the poorer people contrived to eke out a precarious existence on what remained to it of the produce of the soil; but, by the winter of 1846-7, this resource had, in the main, disappeared, and in the following spring the pressure of want had reached a terrible and portentous climax. Eye-witnesses of those woeful months still picture them vividly to their memories, and even now can be hardly trusted to consider them in a historical spirit. Though somewhat checked by the last bonds of protection, the supplies of food that poured into Ireland were, without exaggeration, enormous, and no doubt can exist that, although depending on the interested efforts of private enterprise, they were infinitely larger than they could have been under any system of State interference. But it was not in the power of man to meet the inevitable effects of the general collapse of an entire community, and famine, so to speak, for too long a period contended for the possession of Ireland, and in some places, unhappily, triumphed. The presence, however, of the foul invader was not universal throughout the country; it was confined to certain well-marked limits. In Leinster and the colonised parts of Ulster, and even in Munster, east of the Galtees, the potato was the staple of the body of the people, but there was some capital saved, a retail trade, and a large admixture of English

influences, and here accordingly there was but little starvation, though destitution spread far and wide and society was rudely shaken and disorganised. West of this line, however, through the vast region which extends from Lough Foyle to the borders of Cork, the visitation was much more severe and effectual in the work of destruction. Except at a few cities and favoured spots, this division of Ireland had hardly any commerce. It was the poorest part of a poor country, and was separated from England by hundreds of miles; and hence, when that which had been the sole support of its millions was suddenly swept away, the consequences were most appalling. For several months of 1846-7 considerable tracts in the west of Ireland were literally within the jaws of famine, and, notwithstanding all that was done to avert and baffle its cruel attacks, thousands became victims of the dread destroyer and of its more fatal attendants disease and pestilence. A silent enclosure near the Ilen marks the resting place of a vast mass of mortality which gave a tragic name to Skibbereen; and week after week a fresh tale of premature and afflicting deaths came from Mayo, Donegal, and Galway. In numerous instances, too, doubtless no record exists of what was endured; the unvisited glen, the secluded hut became the grave of many an unknown sufferer; and even as regards the millions who survived, the lean, cadaverous, and sad aspect of the multitudes who sought and obtained relief told too plainly what in many places was the misery of the famished population.

We turn to consider the means adopted to lessen the effects of this awful calamity. It can hardly be said that the Irish gentry afforded the Government much assistance by subscribing funds or employing labour, and throughout the famine the national tendency to make the State do everything was very apparent. It must, however, be borne in mind that in 1846 and the following years the resources of this class were grievously reduced, and that hundreds of landlords were simply beggared, and extraordinary sympathy could not exist between the order, as a whole, and the people. By the winter of 1846-7 the Irish workhouses more than overflowed, and the gigantic mass of destitution caused by the failure of the crop was flung on the system of public works, which had been improvised a few months before—the last plank of safety in the great social shipwreck. Day after day despairing Relief Committees sent fresh numbers to the tale of the employed; week after week the officials of the Board of Works saw with alarm new swarms of hungry figures crowd to the roads which, in every part of the country, were the melancholy scenes of their forced labour; and at last fully 3,000,000 souls were directly or indirectly sustained on wages furnished and controlled by the State. Meanwhile the Government stores were thrown open in the remote districts of the south and west; magnificent and world-wide charity poured its contributions into the afflicted land, and as the Executive adhered to its rule not to interfere with the retail trade, food, though necessarily at an excessive price, was more abundant than could be expected. Condemn it as we may in the abstract, this system of relief preserved Ireland from a catastrophe at which humanity shudders; and if famine made its thousands of victims, the Labour Rate Act, as it was called, the Treasury, and the noble benevolence of England, were the means of saving millions of lives. The expedient, however, of supporting a people on Public Works with the money of the State and under the check of a Central Board only was inevitably fraught with enormous abuses, and when it had become evident that the employers of labour were not likely to give much aid, the Government had to devise other means of dealing with the fearful question before it. Independently of the complete removal of the last restraints on the import of food, the chief of these, with some lesser measures, was the introduction of a new plan of relief, which came into operation in the spring of 1847. Under this

scheme the existing system of forced Public Works was almost abandoned; relief was to consist of food only, the practice of giving relief in money having proved, as may be supposed, most wasteful; destitution was subjected to better tests than that of willingness to work on roads, and the authority of the Board of Works, which previously had controlled everything, and which, though its efforts had been admirable, had been unable to prevent frauds and jobbing on an enormous scale, was distributed within certain limits, and subject to a general supervision among local committees, chosen in the main from the classes liable to the charge of poverty. The Exchequer, as hitherto, was to lend its assistance to Ireland in the hour of distress, and to make the advances that might be required, but half of the cost was to fall, ultimately, as under the Labour Rate Act, upon Irish property.

Under this system Ireland struggled with famine during the spring and summer of 1847. The sufferings of the want-stricken districts continued terrible in the extreme, and though deaths by starvation were comparatively few, the ravages of fever and disease were appalling. The pressure, too, upon all classes throughout the island was beyond example; whole tracts, abandoned by their occupiers, became dreary and barren solitudes; and every town wore a look of penury and gloom. The destitution was so enormous that, notwithstanding the precautions of the law, the number of persons in receipt of relief varied from 2,000,000 to 3,000,000 for months, and the whole structure of landed relations in many places completely collapsed. Yet, owing in a great degree at least to the efforts of the State and of universal sympathy, the nation passed through the fearful ordeal, and the later measures of relief were, in every respect, more successful than those of the earlier period. Relief in food was found more effectual to mitigate distress than relief in money, and much less liable to fraud and wrong; the labours of the local committees were, speaking generally, worthy of praise, and necessarily involved less charge and waste than the cumbrous operations of the Board of Works, and the ultimate cost of the new system was not nearly a half of that of the old. So the summer of 1847 passed, and as prodigious supplies of food continued to flow in from abroad and the harvest promised an abundant yield, the tremendous strain by degrees slackened, and the portentous mass of the recipients of relief in some measure declined in numbers. "Land," in a word, was seen through the breaking storm, and Parliament very rightly decided that, if the State should still aid Ireland, securities should be taken if possible against the recurrence of what had happened. The Poor Law was extended and made effective by a necessary license for outdoor relief, on a large and yet not an extravagant scale, and though grants from the Treasury were even now made, the principle was distinctly asserted that Irish property should support its poverty. Efforts were also made to attract capital to Ireland, and to quicken her industry, by loans for draining and landed improvement, and by the simplification of landed tenures; and the Encumbered Estates Act was at last passed—a reform which almost resettled the soil and freed it from a race of nominal owners, unable to perform their social duties. These combined measures had admirable effects, and though from 1848-1851, when the famine period may be said to have closed, Ireland passed through a season of long distress, and the sufferings of thousands were still severe, destitution was effectually relieved and controlled, and society emerged from what, at one time, seemed an irremediable and hopeless crisis. Meanwhile the visitation had consequences which were to prove the best and, indeed, the only real means of solving the greatest of Irish difficulties. The circumstances of 1846-7 had lifted literally in millions from the soil the dense masses of Irish poverty, and as the Poor Law and other measures of relief had made the possession of land a bar

to State aid, this dead weight of wretchedness was largely prevented from permanently returning to the occupation of the soil on which it had hung as a destructive burden. By degrees, and in a variety of ways, it was borne to other parts of the world; and thus began that immense emigration which has ever since been in steady progress, and has affected to such a remarkable extent the destinies of Ireland and other countries. That the exodus was accompanied by much suffering and premature mortality is but too true, but most certainly it was the first condition of a real change for the better in Ireland; and, notwithstanding sentimental complaints, those who have derived the greatest advantage from it have been, as was just, the Irish race.

A few figures will, perhaps, strengthen our impressions of the famine of 1846–7. The deaths by starvation have been estimated at 27,000; and 275,000 persons are believed to have perished from disease or decay more or less traceable to the dread visitation. On the other hand, from 1,000,000 to 3,000,000 persons were supported almost wholly by the State from 1846 to the end of 1847, and, terrible as the mortality was, it sinks into insignificance compared with that of 1740-1. The charge of sustaining this mass of poverty considerably exceeded £6,000,000; and, without taking into account the enormous burden of the poor rate from 1848 to 1851, the Government advances in respect of the famine reached ultimately more than £10,000,000, of which nearly half was a free gift. The contributions of private charity are supposed to have exceeded £2,000,000, and probably such efforts were never made to rescue from want a suffering people. As for the population, it certainly declined 1,500,000 from 1846 to 1851; but emigration accounts for 900,000 of these, and, taking the abnormal deaths at 300,000, the residue is to be found in ordinary deaths and in an extraordinary diminution of births. In many instances the effects of the famine were to destroy and paralyse human affections, and to transform the nature of man into brutishness, as has always happened in similar trials; but the conduct of the people on the whole was admirable—a model of patience and kindly sympathy. The measures of the Government were, in the main, judicious, and if some exceptions may be taken to them, we must recollect the immense proportions of the calamity. It is perfectly clear the Cabinet was right in interfering with trade as little as possible, and in refusing to make the State the principal agency for the procuring of food. In emergencies such as 1846-7 private enterprise is to Government effort what the continuous flow of the silent dew is to a sudden and wasting shower in reviving the face of languid nature, and never, perhaps, was the power of commerce in alleviating and removing the ills of dearth so exemplified as at this great crisis. As for the demands urged by short-sighted ignorance that corn should not be allowed to leave Ireland, this would have enriched a few speculators, made the State responsible for the supply of food, in all probability aggravated want, and certainly done enormous injustice; and equally mischievous was the specious cry for Government depots all over the country. Even the agitation for what was called reproductive works on a prodigious scale was properly discountenanced by the Administration. This plausible claim involved a system of forced labour to an inconceivable extent, which would have proved fatal to natural industry; nor was much to be said for fanciful schemes, such as the reclamation of bogs by the State, or Lord George Bentinck's project of promoting railways. We incline to think that the only fault which can in fairness be found with the Government was that it did not summon Parliament in the autumn of 1846 and terminate the labour rate system sooner; and certainly Lord Russell was not alive to the peculiar importance of emigration at this juncture as a process of relief. We must not, however, scan too closely doubtful errors like

these; and the sentence of history, we are convinced, will be that England and her rulers at this trying period were not unequal to their arduous duties.

A quarter of a century has since passed away. How different now is the state of Ireland from what it was before 1846! Political troubles, indeed, survive: a few signs of agrarian disturbance exist, and in all that constitutes material well-being there is still room for no little improvement. The progress of Ireland has not been so rapid in the last ten years as it promised to be: her agriculture is still backward; the mud cabin still too often marks the presence on the soil of the pauper occupier; the peasantry in Munster and Connaught still rely too much upon the potato. But, compared with the period before the famine, Ireland is a land of plenty and happiness; and there is abundant evidence that this prosperity will steadily advance with the march of time. Society in the island no longer rests on foundations utterly false and unstable; it no longer depends on a treacherous root; it is not now ever on the verge of an abyss, removed only a step from ruin. The legislation of 1847-50 has borne great and beneficent fruit: the Poor Law system has developed its results, and while property is compelled to support poverty, it keeps down its perilous growth. The discipline of the Encumbered Estates Court has made the upper classes frugal and prudent, and the Land Act of 1870 will, we hope, improve landed relations and encourage husbandry. These reforms have done much to control pauperism, to augment wealth, and to promote industry; yet their effects would have been little without the removal of the redundant population from the land through the immense emigration of the last twenty years. This, we repeat, has been the great gain of Ireland since 1846–7; it has relieved the country from a burden beyond the resources of a far richer nation; it has freed society from a most serious danger; it has made real agriculture possible and liberated the soil from a fatal mortmain; and it has done more than anything else to raise the condition of Irishmen abroad and at home. We shall not argue with those who contend that the Irish exodus was a calamity to which statesmen should look with regret; and it is nothing to the purpose that in a different state of society from that of 1844–5 Ireland might have supported her teeming millions without imperilling the whole community. The general results of this revolution have been gratifying in the extreme, and they are visible in every part of the island and in the relations of all classes. The wealth of Ireland has enormously increased since 1846; her rental has risen at least one-fourth; the profits of farming have probably doubled; the wages of labour have, in places, trebled; and, tried by every conceivable test, her history has been one of decisive progress. The happiest change of all, certainly has been in the aspect of the peasantry: the misery of the past has almost disappeared; corn has largely replaced the potato as food; and you meet looks of health and content where all had been degraded wretchedness. If the famine was a terrible visitation, it has been ultimately a source of welfare; and in this, as in other instances, Providence has caused good to grow out of evil.

MR. SIMON ON THE PREVENTION OF FILTH-DISEASES.[1]

In our article in the last number of the *Practitioner* on Mr. Simon's Report on Filth-diseases, we left untouched his observations on the forms in which Filth is found producing disease, and on the prevention of Filth-diseases.

There is a special lesson conveyed in Mr. Simon's description of Filth operating as it stands. He writes:—

"There are houses, there are groups of houses, there are whole villages, there are considerable sections of towns, there are even entire and not small towns, where general slovenliness in everything which relates to the removal of refuse-matter, slovenliness which in very many cases amounts to utter bestiality of neglect, is the local habit: where, within or just outside each house, or in spaces common to many houses, lies for an indefinite time, undergoing fœtid decomposition, more or less of the putrefiable refuse which house-life, and some sorts of trade-life, produce: excrement of man and brute, and garbage of all sorts, and ponded slop-waters: sometimes lying bare on the common surface; sometimes unintentionally stored out of sight and recollection in drains or sewers which cannot carry them away; sometimes held in receptacles specially provided to favour accumulation, as privy-pits and other cesspools for excrement and slop-water, and so-called dust-bins receiving kitchen-refuse and other filth. And with this state of things, be it on large or on small scale, two chief sorts of danger to life arise: one, that volatile effluvia from the refuse pollute the surrounding air and everything which it contains; the other, that the liquid parts of the refuse pass by soakage or leakage into the surrounding soil, to mingle there of course in whatever water the soil yields, and in certain cases thus to occasion the deadliest pollution of wells and springs. To a really immense extent, to an extent indeed which persons unpractised in sanitary inspection could scarcely find themselves able to imagine, dangers of these two sorts are prevailing throughout the length and breadth of this country, not only in their slighter degrees, but in degrees which are gross and scandalous, and very often, I repeat, truly bestial. And I state all this in unequivocal language, because I feel that, if the new sanitary organisation of the country is to fulfil its purpose, the administrators, local and central, must begin by fully recognising the real state of the case, and with consciousness that in many instances they will have to introduce for the first time, as into savage life, the rudiments of sanitary civilisation."

Such is the language which Mr. Simon feels called upon to use in describing a largely existing state of things among us after thirty years' sanitary legislation and work. The new

[1] Reports of the Medical Officer of the Privy Council and Local Government Board. New Series, No. II., 1874. In our last number, two misprints occurred in the article on those reports. For Dr. "Maxall" should be read Dr. *Blaxall*; for "Mr. D. N. Power," Mr. *W. H. Power*.

sanitary authorities must begin their duties, if they are to be satisfactorily fulfilled, by recognising that in not a few instances they have to introduce the rudiments of common cleanliness among communities. Until this be done, the later knowledge we possess of Filth operating at a distance can hardly be effectually inculcated or acted upon. Of this distant operation, brought about by imperfect arrangements for sewerage and water-supply, Mr. Simon next gives a brief description. "For instance, houses which have unguarded drainage, communication with cesspools or sewers, may receive through such communication the same filth-infections as if excrement stood rotting within their walls; and public or private water-reservoirs or water-conduits, giving accidental admission to filth, will carry the infection of the filth whithersoever the outflow reaches."

Now, whatever the defects may have been in sanitary legislation, so far as common filth is concerned operating where it stands, there has not been wanting since 1848 sufficiently comprehensive powers enabling local authorities to deal with it, if not with the completeness now sought for, at least so as to show some less degree of barbarism than existed at that date. Why there should have been so considerable a failure in the exercise of these powers is part of the familiar sanitary history of this country. Something rested with defective law, something also with defective organisation of the local authorities for sanitary purposes. These imperfections have been progressively amended, but there has been no corresponding amendment of the common filth of communities, except only in special instances. Whatever might be done to give greater efficiency to the law and to the organisation of the local sanitary authority, it gradually becomes evident to thoughtful persons that no amendment of the law and no improvement in the formation of the sanitary authority would prove effective unless some provision were made for the intelligent comprehension of the subject-matters of the law. From the beginning this had been admitted without question so far as the legal construction and bearing of the sanitary laws were concerned, and sanitary authorities almost as matters of course had their sanitary advisers. But in regard to the essential matters for which the law was conceived, the preservation of the public health, or in other words the prevention of disease, this was universally held to be a matter

of common intelligence, and throughout the kingdom the inspector of nuisances, rarely other than a man of ordinary local intelligence, was regarded as the interpreter of all that concerned the health and physical well-being of the community. Whatever might be the advances made in sanitary knowledge, this was almost invariably reduced in local practice to the level of the comprehension of the inspector of nuisances, who, however essential and important in his place, neither by previous training nor by current opportunity was in the position to comprehend other than the common routine of municipal or rural cleanliness. This cleanliness was so absolutely a rule-of-thumb conception, that even where the inspector was most active, and most fully supported by his authority, it left almost unaffected the unwholesomeness of the filth it was designed to remove. Take, for instance, this action in respect to excrement-nuisance, when almost universally under this sanitary practice effective action was deemed to be obtained, when midden-steads were prevented being filled to overflowing, notwithstanding that they might contain many months' accumulation of Filth in a horribly offensive and mischievous state.

The General Board of Health on its establishment in 1848, expressing the opinion of all trained observers of sanitary work, pointed out that an essential element in successful work was a properly qualified medical officer of health,—essential because it was only in proportion as sanitary measures were put in operation with intelligent knowledge of the effect they were calculated to have in preventing disease, that this effect could be certainly secured. Such knowledge implied a medical training, and as a rule was only possessed by qualified medical men. It was not until the passing of the Public Health Act 1872 that this important principle was recognised by the Legislature, and the appointment of a medical officer of health was made compulsory upon all sanitary authorities. At length the great end at which sanitary workers had been long aiming was secured, and the newly appointed Local Government Board, under its first President, Mr. Stansfeld, had the honour of carrying successfully through the Legislature the recommendation of the Royal Sanitary Commission of 1869 on this subject. This was the crowning fact of sanitary legislation. It provided for the intelligent appreciation (in the true sense of the phrase) of

the ways in which Filth becomes destructive, and in which cleanliness becomes preventive of destruction, without which Sanitary Acts are waste-paper and sanitary administration illusive.

Hitherto the inefficiency of sanitary law had arisen from defects of local administration. As the *Pall Mall Gazette* has aptly said: "We had already exhausted every source of administrative inefficiency which is to be found in inadequacy of powers, defects of initiative, and obscure intricacy of law. We had set up sanitary authorities who could not act, authorities who would not act, and authorities who did not know when, where, and how to act; it remained for us to establish authorities who could and must act, and then misdirect and mislead them into a confusion worse than inactivity. Having failed in every possible way at the circumference, we had yet to fail at the centre, and we have done it." In no respect has this misdirection and misleading been so conspicuous as in regard to the medical officer of health. The Local Government Board has deliberately entered upon the task of stultifying the appointment of this officer, by advising sanitary authorities through its inspectors that the actual work of prevention of disease rests with the inspectors of nuisances; the duties of the medical officers of health being especially directed to the limitation of disease when it occurs. As Mr. Henley puts it in a recent report on the working of the Public Health Act 1872: "It is only in those more serious and happily rare encounters with enemies whose detection and extermination require the insight and the astronomy of science, that the intervention of the medical officer of health will be indispensable. In ordinary times and under ordinary circumstances it is the inspector of nuisances who will fight the sanitary battle." In other words, the work of prevention of disease is a work for the inspector of nuisances, not for the officer of health; the experience of thirty years on this subject going for nothing with the Local Government Board. It is true that Mr. Henley in a subsequent sentence writes—"A sanitary organisation which should present an army of active and intelligent nuisance inspectors, well officered by men of scientific training, would certainly be competent to effect a revolution in the present unsanitary condition of the country;" but his notion of the

officer is that his duty is to fight only against actually existing disease, not against the causes thereof, and to train the inspector of nuisances in the effective performance of subordinate duties which devolve upon him in carrying out the struggle. The Local Government Board has in fact adopted the monstrous course of advising sanitary authorities that the question of prevention of disease is a question of abatement of nuisance as conceived by the inspector of nuisances; and that success is to be measured by the removal of gross nuisance. It has deliberately stultified the appointment of medical officer of health, and throws its influence wholly into a perpetuation of the rule-of-thumb interpretation of nuisances which existed before the Public Health Act 1873; apparently believing that by multiplication of ignorance knowledge is acquired. The disastrous results of this policy are becoming very apparent in much futile and misdirected sanitary exertions, in a depreciation of the medical officer of health's proper duties and status, and in the almost hopeless misleading of sanitary authorities. That some gain of cleanliness will be obtained under the new sanitary organisation is a necessary consequence of a somewhat wider spread knowledge of decency; but of sanitary work, as a work of disease-prevention, to be carried out with strict reference to such object, and to be tested in its efficacy by results, no conception has been imported into the sanitary administration of the Local Government Board.

Mr. Simon proceeds to indicate the chief sources of excremental infection in regard to sewerage, illustrating in succession the want of sewers, the faults of sewers, the defects of house drainage and of water-closets and accumulative privies. Especially he points out how often house drainage, though done with good workmanlike intention, has failed for want of skilled guidance. On this point the appended reports of Dr. Blaxall and Dr. Buchanan on local outbreaks of enteric fever are of great value. He next discusses the standard by which arrangements for excrement-removal should be judged, adopting here the principles laid down in Mr. Netten Radcliffe's report on Excrement Nuisance, and indicates how flagrantly this standard is contravened in general practice. Following upon this are important observations on the importance of studying exceptional outbreaks of disease, and the strictness of search

these often require for successful elucidation. He illustrates this part of his report by reference to Dr. Ballard's discovery of the transmission of enteric fever by infected milk supply, and the important results it has led to as shown in the appendix to his report. He then proceeds to consider the prevention of Filth-diseases.

This section of Mr. Simon's report consists of a unique summary of the principles upon which the prevention of Filth-diseases rests. The only satisfactory mode of dealing with this part of the report would be to reprint it. This, however, is needless, as all who are interested in the subject must read it. We cannot refrain, however, from quoting the introductory paragraph :—

"In order to the prevention of Filth-diseases, the prevention of Filth is indispensable. Truism though this may seem, I think it needs to be expressly insisted on, as against any belief that districts, allowed to become filthy, can off-hand be made whole by disinfectants. To chemically disinfect (in the true sense of that word) the filth of any neglected district, to follow the body and branchings of the filth with really effective chemical treatment, to thoroughly destroy or counteract it in muck-heaps and cesspools, and ashpits, and sewers, and drains, and where soaking into wells, and where exhaling into houses, cannot, I apprehend, be proposed as physically possible ; and the utmost which disinfection can do in this sense is apparently not likely to be more than in a certain class of cases (see § 39) to contribute something collateral and supplementary to efforts which mainly must be of the other sort. This opinion, as to the very limited degree in which chemistry can prevail against arrears of uncleanliness, does not at all discredit the appeals which are constantly and very properly made to chemistry for help in a quite different sphere of operation ; with regard, namely, to the management of individual cases of infectious disease, and to the immediate disinfection of everything which comes from them. In this latter use of disinfectants, everything turns on the accuracy and completeness with which each prescribed performance is done ; but such accuracy and completeness are of course only to be ensured where operations are within well-defined and narrow limits ; and in proportion as disinfection pretends to work on indefinite quantities or in indefinite spaces, it ceases to have that practical meaning. Again and again in the experience of this department a district has been found under some terrible visitation of enteric fever, from filth-infection operating through house drains or water-supply ; but with the local authority inactive as to the true cause of the mischief, and only bent on practising about the place, under name of disinfection, some futile ceremony of vague chemical libations or powderings. Conduct such as this, referring apparently rather to some mythical "epidemic influence" than to the known causes of disease, and savouring rather of superstitious observance than of rational recourse to chemistry, is eminently not that by which Filth-diseases can be prevented ; and, contrasting it therefore with means by which that result can be secured, I would here specially note a warning against it."

THE VACATION IN RELATION TO INFECTIOUS DISEASES.

HARDLY have the preliminary flights preceding the migratory rush of the vacation into the country and to the sea coast commenced, when an appeal reaches us relating to infectious disease contracted away from home. A child is convalescent from scarlet fever, but the peeling of skin is not yet at an end. It is desired to remove him to his home, but it is understood that he may not be carried there by public conveyance until danger of infection is at an end. What is the law of the subject? Such is the question put, and it seems to us that it may be useful at the present moment to state briefly, for the information of such of our readers who are unfamiliar with the Sanitary Acts, the law as to infectious diseases. First, however, we would offer a preliminary suggestion. Whenever infectious sickness appears among families when away from home, especially if they are living in hired apartments, the readiest and surest way of meeting the requirements of the law will be to summon the medical officer of health of the place or district and entrust to him, where necessary, those precautionary measures which the law requires to be taken after the termination of the sickness. By such a course being taken, the medical attendant will relieve himself of a responsibility which he would often perhaps find irksome; the proprietor of the hired rooms would facilitate their reoccupation, and the measures of disinfection would be executed under the supervision of the public officer who is responsible for the health of the community, and who will have at his command all necessary means to give to them efficiency.

The following is the law as to infected persons or things:—

Any person suffering from a dangerous infectious disorder, who wilfully exposes himself without a proper precaution against spreading the disorder in a street, public place, or public conveyance;

Any person in charge of such a patient who thus exposes him;

Any owner or driver of a public conveyance who does not

immediately provide for its disinfection after it has, with his knowledge, conveyed such a patient;

Any person who, without previous disinfection, gives, lends, sells, transmits, or exposes anything which has been exposed to infection;

is liable to a penalty not exceeding 5*l.*

Persons transmitting, with proper precautions, articles for the purpose of having them disinfected, are exempted from the action of this provision.

If a person suffering from any dangerous infectious disorder enters a public conveyance without previously notifying to the owner or driver that he is so suffering, he is liable to a penalty not exceeding 5*l.*, and he is also required to pay the owner and driver all the losses and expenses they may suffer in carrying into effect the provisions of the Sanitary Act 1866, as to disinfection, which affect them.

No owner or driver of a public conveyance can be required to convey any person so suffering before payment of a sum sufficient to cover all these losses and expenses.

As to infected lodgings, it is provided that persons knowingly letting a house, room, or part of a house in which any person suffering from any dangerous infectious disorder has been, without having the premises, and all the articles therein liable to retain infection, disinfected to the satisfaction of a qualified medical practitioner, as testified by his certificate, will be liable to a penalty not exceeding 20*l.* For the purposes of this provision an innkeeper is deemed to let part of a house to any person admitted as a guest into the inn.

If an owner or occupier or person employed to let for hire or to show for the purposes of letting for hire, a house or part of a house, when questioned by a person negotiating for its hire as to the fact of there being in it, or having within six weeks previously been in it, a person suffering from an infectious, contagious, or epidemic disease, knowingly makes a false answer to such question, he is guilty of an offence, punishable on summary conviction. At the discretion of the justices having cognisance of the case, he is liable to be imprisoned, with or without hard labour, for a period not exceeding one month, or to pay a penalty not exceeding 20*l.*

The foregoing are the provisions of the law respecting infectious diseases which it chiefly concerns persons frequenting seaside and rural health-resorts in vacation to be acquainted with. Other provisions of the law refer to the powers and duties in relation to infectious diseases and hospitals which the sanitary authorities may exercise. These are of great importance, and include the power of cleansing or disinfecting a house or part of a house, upon the certificate of a qualified medical practitioner that these measures would tend to prevent or check the spread of infectious or contagious disease. These measures may be carried out at the expense of the authority, or of the owner or occupier, according to the circumstances of the case. The Sanitary Authority may direct destruction of bedding, clothing, or other articles exposed to infection from any disorder, and may give compensation for the articles destroyed. It is empowered also to provide a proper place, with necessary apparatus and attendance for the disinfection of woollen articles, clothing, or bedding, and to cause articles brought for disinfection to be disinfected free of charge; also to provide and maintain carriages for the conveyance of persons suffering under contagious or infectious disease to a hospital for the reception of the sick, or to the patient's own home, and may itself pay the cost of conveyance. Justices are empowered, on the certificate of a qualified medical practitioner, to order the removal, at the cost of the Sanitary Authority, to a hospital prepared to receive infectious sick persons suffering from any dangerous contagious or infectious disorder, being without proper lodging or accommodation, or lodged in a room occupied by more than one family, or being on board any ship or vessel. The Sanitary Authority may make rules, to be sanctioned by the Local Government Board, for removal to hospital and detention there so long as may be necessary, any persons brought within the district by ship or boat, and infected with a dangerous infectious disorder.

Such are the provisions briefly stated of the Sanitary Acts in relation to infectious diseases. Special provisions are made with reference to cholera brought into a district by ship or boat under an order of the Local Government Board, dated 17th July, 1873.

THE PRACTITIONER.

AUGUST, 1875.

Original Communications.

ELEPHANTIASIS ARABUM.

BY JOSEPH FAYRER, C.S.I., M.D., F.R.S.E.

Honorary Physician to Her Majesty the Queen; Physician to H.R.H. the Duke of Edinburgh.

Synonyms.—Morbus elephas; Bœnemia tropica; Elephantiasis indica; Spargosis; Hernia carnosa; Phlegmasia Malabarica; Egyptian sarcocele; Barbadoes leg; Cochin leg; Gall leg; Yaw leg; Elephant leg; Glandular disease of Barbadoes.

It is known in different parts of India as—

دآءِ فیل—Da-ool-feel (Arabic.)

فیل پای—Feel-pai (Persian.)

ھاتھی کا پاؤں—Hathi-ka-pahon (Gordoo.)

श्लीपदं—Sleepatham (Sanscrit.)

पादवल्मीकं—Panthavalumeekum (Sanscrit.)

Peerun-Kaal (Tamul.)

Munthu Kaal (Malyalim.)

Motha-Kaaloo (Teloogoo.)

Kya-gyee-Na (Burmese.)

Definition.—A non-contagious disease, endemic in certain localities, generally intertropical, and near the sea-coast, characterised by recurrence of febrile paroxysms attended by inflammation and progressive hypertrophy of the integument and areolar

tissue, chiefly of the extremities and genital organs; and occasionally by swelling of the lymphatic glands, enlargement and dilatation of the lymphatics, in some cases by the co-existence of chyluria and the presence in the blood of certain nematode hæmatozoa; the hypertrophy of the integument resulting in enormous enlargements of the extremities, scrotum or labia, accompanied by an albuminous deposit in the cells of the areolar tissue, and by degeneration of the muscular and osseous tissues.

Natural History.—It is endemic in India, the Malayan peninsula, China, Egypt, Arabia, the West Indies, parts of America, chiefly within the influence of the sea air—and probably, sporadically, all over the globe, perhaps excepting in extreme northern and southern regions.

Certain conditions of soil and climate, such as humidity, heat, malarious influences, and proximity to the sea-coast, seem to be concerned in producing and in influencing its development. It has been observed that removal from the territorial endemic area checks, whilst return there reproduces the disease.

It is totally distinct from Elephantiasis Græcorum (true leprosy), with which, the same generic term being applied to both, it is still sometimes confounded: they are as unlike in their symptoms as in their pathology, and really have nothing in common; though, as shown by V. Richards, they are occasionally co-existent in the same individual. Of 636 cases recorded by him in Orissa, forty individuals, or 6·29 per cent., were thus affected.

It seems desirable that a name founded on the pathological characters of the disease should be substituted for that now in use, to distinguish it from one with which it has no affinity. But the term Elephantiasis, derived from the fancied resemblance of the parts affected to the limbs of an elephant, is, if retained at all, more appropriate to this form of disease than to Elephantiasis Græcorum, or tubercular leprosy.

Bateman, however, in reference to this, says that the following distinction was drawn by Arabic writers, who described bucnemia as elephas, whilst leprosy was called elephantia; though here, again, there seems to be some confusion among terms by their translators.

The ordinary form in which the disease presents itself is hypertrophy of the integument and areolar tissue of some part of the trunk or limbs, and notably of the legs and genital organs. The skin becomes enormously thickened by hypertrophy of all the fibrous elements of its structure, attended by the deposit of a quantity of albuminous fluid in the cells of the areolar tissue. The papillæ are prominent and much increased in size. The integument is formed into hard masses or folds, with a rugose condition of the surface, not unlike the appearance of an elephant's leg. The feet and toes are sometimes almost hidden, and the scrotum or labia form enormous

Fig. 1.

outgrowths, often attaining great weight in the male, accompanied by large hydroceles. From the male they have been removed weighing upwards of 100 lbs.

The appearance of such a tumour, where the disease has its chief seat in the integuments of the penis, is well shown in Fig. 1. In some cases, these are the seat of a dilated and turgid condition of the lymphatic vessels, which during the periods of vascular excitement, when the febrile attacks occur, give way and discharge a chyle-like fluid; in others the surface assumes a temporarily herpetic condition which weeps an acrid and offensive serous exudation.

These outgrowths are the local expressions of a constitutional disease, and are not to be regarded merely from their local point of interest. They are the result of certain climatic influences whose exact nature is not at present determined; though, considering the geographical range of the area where the disease is endemic, it seems probable that, whatever other cause may be at work, the so-called malarious influences play an important part in its production.

The recent researches of Mr. T. Lewis into the pathology of chyluria in India, and his discovery of certain hæmatozoa in the blood of those affected with that disease, coupled with the fact that the subjects of chyluria and hæmatozoa are also frequently, if not always, affected by elephantiasis with its febrile paroxysms, hypertrophied integument and lymphatic disturbance, are not only very suggestive of a community of origin of these morbid conditions, hitherto regarded as different, but also tend to suggest an explanation of other imperfectly understood forms of tropical disease and cachexiæ.

The ordinary condition of elephantoid hypertrophy of the limbs or genital organs no doubt frequently exists independently of chyluria, of the presence of hæmatozoa, or of any obvious change in the state of the lymphatics; but their frequent concurrence, and the difficulty of detecting the parasites in many cases where they probably do exist, seem to indicate that further minute investigation of the subject may reveal a common origin of this disease with others due to the influence of tropical and malarious climates, and throw light on its relation to them.

It may be well, whilst recognising that hypertrophy of the integument may occur in other conditions, to limit the term Elephantiasis as now used, to the constitutional form of the disease that occurs within certain endemic areas, and which is

manifested by paroxysmal febrile attacks, accompanied by a disturbed condition of the lymphatic system, chyluria, hæmatozoa, and progressive inflammatory hypertrophy of some portion of the tegumentary system.

There cannot be a doubt that cases occasionally present themselves not only in India and the tropics, but also in Europe and elsewhere, in which hypertrophy of the integument alone, or in combination with a greatly disturbed and dilated state of the lymphatics and glands, with or without a certain amount of constitutional disturbance, occurs; and although it may be so far correct to call such cases Elephantiasis, it should be borne in mind that they are more local in character than the disease with which we are familiar in malarious intertropical countries.

Elephantiasis affects both sexes, and persons of all ages and conditions of life. No race is exempt, but it is much more frequent, relatively, in the dark than in the fair races, and it appears that men suffer in a much larger proportion than women.

Waring says that of 945 cases observed in Travancore, 716 were males, or 75·76 per cent.; whilst 229 were females, or 24·34 per cent., or about 3½ males to one female. It must be remembered that prejudices against submitting females to treatment or examination exist strongly in the East, and may in some measure account for the disproportion.

It happens to all, from infancy to extreme old age, but is most common in adult and middle life: it comparatively rarely begins in a very young child or an aged person: the period of life between twenty and forty, being that most liable to suffer.

Some authorities deny that it is hereditary. Richards, who has carefully studied the disease in Bengal, says he is persuaded that hereditary predisposition is frequently a leading cause of its manifestation. Of 236 persons, 193, or 73 per cent., had one or both parents affected.

It not unfrequently occurs without much or any obvious injury to or disturbance of the general health during the intervals between the febrile attacks, which in some cases are few and slight. The appetite, spirits, and strength are good, the functions are all normally performed, and the only inconvenience is that due to the size and weight of the outgrowth. On the other hand, it is frequently quite the reverse: the rapidly

recurring febrile attacks, the pain, exhaustion, suffering, and visceral complications, induce a state of cachexia and debility sometimes so serious as to render even surgical interference impracticable. Withal, it should be stated that hepatic and splenic enlargements do not as a rule result from the persistence of the elephantoid fever alone, though not unfrequently, as a more direct result of malarious poisoning, they seriously complicate the evils of the sufferer's condition. It should be noted that albuminuria, as well as chyluria, is occasionally present.

In some cases, after the outgrowth has attained a certain bulk, it ceases to grow altogether, or increases slowly and insidiously without febrile disturbance, and in such cases the general health remains good, but there is generally a tendency to recurrence of the fever once or twice a month; when the parts affected become tense, hot, painful, and swollen, and often discharge a serous or lymph-like fluid, which may be acrid and offensive. Some tumours, on the other hand, are very slightly, if at all so affected, and remain perfectly dry.

In all cases, however, some growth goes on, and even when, as occasionally happens, fever has ceased to recur, there may be a gradual, but slow and painless increase of the hypertrophy. The greatest variety and uncertainty obtain in the duration and progress of the growth; sometimes it is very rapid, at others it is slow, with intermissions of activity and indolence of development.

According to Richards, the average duration of the disease, as deduced from the observation of 636 cases, was 11½ years, and he notes that the earliest age was nine years, whilst the latest at which he observed it was eighty years.

It appears from this that the disease has little influence in shortening the duration of life. Richards further remarks that the period at which it first appears is by no means limited, though it principally attacks persons between the ages of fifteen and forty years, and that he had never known an infant to be attacked. It must be noted, that experience proves that young infants are not exempt, though in them it is rare.

In certain cases there is some reason to believe that it interferes with the procreative powers, not only mechanically, but

by the cachexia and debility induced. Men, however, who have long been incapacitated, have become fathers after removal of the tumour, and there seems no ground for concluding that the presence of the disease elsewhere than in the genitals, unless it be accompanied by exhaustion and debility, causes failure in the generative powers in either sex; though it would seem that some women have a tendency to miscarry when suffering from elephantiasis.

Various causes are assigned for the disease in the regions where it prevails. Air, water, food, and, as it is frequent near the sea-coast, eating fish have been frequently credited with it. The presence or vicinity of certain forms of vegetation, the geological formation of the soil, have each and all been regarded as predisposing and determining causes, but not with sufficient reason. Climate and locality, combined with bad living, are doubtless the real predisposing causes; and it is probable that, as Mr. T. Lewis has suggested, like other unhealthy conditions observed among persons residing in tropical climates, especially those implying disturbance of the lymphatic system, it may be found to be intimately associated with the presence in the blood of certain parasites.

Mr. Lewis describes the *Filaria sanguinis hominis* as a small nematode entozoon, often exceedingly difficult to detect, and sometimes found in great numbers in the blood of persons suffering from chyluria and elephantiasis. This Filaria is inclosed in a tubular sheath, within which it elongates or shortens itself; the average diameter is about that of a blood-corpuscle, and its average length about forty-six times that of its greatest width, *i.e.*, its diameter is about $\frac{1}{3500}$, and its length $\frac{1}{75}$ of an inch. It varies, however, slightly in size. It approximates more closely to *Filaria medinensis* in embryo than to the larval stage of *Trichina spiralis*, though much smaller than either, especially in breadth.

It is impossible not to recognise the important bearing that these researches of Mr. Lewis have on the causation and pathology of elephantiasis, chyluria, and disordered conditions of the lymphatic system, in referring them etiologically to a common origin.

Further investigation may probably not only confirm these

views, but throw fresh light on the subject, and may perhaps show that the disease is endemic in certain districts, because it is there that this particular Filaria is indigenous, and because, for similar reasons, the blood of the indigenous residents is fitted to be its habitat.

Dr. A. Webb believed that in some cases the disease had a syphilitic origin. This view, however, has not met with much support, nor is it founded on any very convincing evidence. As to its malarious origin it may be said that whilst the disease occurs in those regions where malarious poisoning prevails, it is not always most prevalent where paludal fevers are most severe, and that though frequently complicated with elephantoid fever is not actually identical with malarious fever. It seems probable that its occurrence, as in the case of dysentery, goitre, and other forms of disease, may be in some way determined by those causes that give rise to intermittent fever, such as we are wont, failing a more precise definition, to call malarious.

The subjects of this elephantoid fever, at least in India, are very strongly impressed with the belief that it is due to lunar influences, and have the firmest belief that the paroxysms are synchronous with and dependent on the changes of the moon; as it undoubtedly does frequently happen that the febrile accessions and excitement of the local changes take place coincidently with lunar changes, it is not strange that a notion which is of such universal acceptance among certain classes, as the influence of the moon on vital action, whether in disease or health, should find favour where there is such apparent ground for believing in it. Such at any rate is the case, however, and one might as well try to persuade the sufferer that he had no fever at all, as that it was not so determined.

No race is exempt from the disease, but, whatever may be the explanation, the white suffer less than the dark races. It does occur occasionally, though very rarely, in the pure European in India, but more frequently in those of mixed descent; it will generally be found that where it occurs in persons of apparently European parentage, that there is a mixture, however slight, of dark blood. Waring says that the lower animals are not exempt: and even birds have been known to suffer from

swelling of one or both legs, which, though unaccompanied by fever, was in all respects similar to the hypertrophy of elephantiasis.

The disease occurs in different forms and in various degrees of severity. In some the attacks of fever are of repeated recurrence, from intervals of a fortnight to that of months; the increase of hypertrophy in the limbs or genital organs being rapid. In others the febrile paroxysms are irregular, of slight intensity, and the growth of the hypertrophy is slow and less pronounced.

Long intervals of quiescence, varied by occasional increase of the swelling, with very little manifestation of a febrile tendency, occasionally occur, and in certain cases there is continuous increase unattended by any obvious disturbance of the general health.

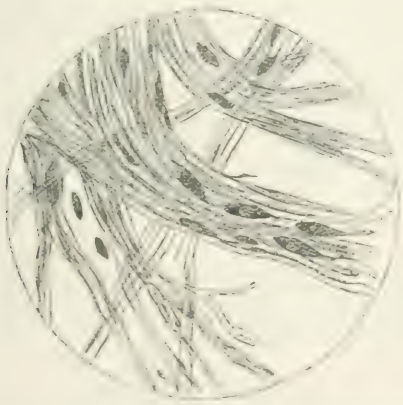

FIG. 2.—Microscopic appearances presented by a fragment after prolonged maceration in glycerine—showing areolar tissue (chiefly) in a hypertrophied condition. Magnified 300 times.

The hypertrophy in most cases appears to be simply an increase in the natural elements of the part, the blood-vessels and lymphatics sharing in the growth. The accompanying engravings represent the microscopical structure of the tumour shown in Fig. 1, and which was most kindly examined for me by Mr. T. R. Lewis. In others the lymphatics and lymph spaces are most concerned, giving rise to a condition that has been

described as nævoid elephantiasis, in which the appearance of a soft and fluctuating swelling, which when punctured gives issue to a white or pinkish fluid, very closely resembling chyle, is presented. The lymphatic glands also share in the enlargement. In other respects the progress of this is like that of the ordinary form of the disease. In the majority of cases of scrotal elephantiasis, one of the earliest symptoms is the formation of hydrocele.

In certain cases occurring in Europe the increase in size of the lymphatics occurs without more marked constitutional dis-

FIG. 3.—Appearance of another fragment stained in a solution of aniline and glycerine, dilute acetic acid being subsequently added. In the midst of the fibrous tissue the more or less transversely cut fibres of non-striated muscles are seen. Magnified 500 times.

turbance than occasional fits of excitement in the part, accompanied by increase of temperature and discharge of chyle-like fluid from the distended and attenuated vessels, the loss of which, when profuse, as it sometimes is, causes considerable exhaustion. These cases, though perhaps not identical with, are very closely allied to, true elephantiasis.

TREATMENT.

The treatment of elephantiasis is both medical and surgical. But little impression has as yet been made by constitutional treatment. Remedies, though useful during the febrile paroxysms,

in moderating their severity and the excess of local action, have little power in preventing recurrence or in checking the onward progress of the disease.

Preparations of iodine, in combination with quinine, arsenic, and iron, have all been found useful to a certain extent. During the febrile state salines, diaphoretics, and such remedies as are needed during the pyrexial state of malarious fevers, are indicated. The internal use of opium in some form may be necessary to relieve the intense pain which often accompanies the onset of the stage of excitement, when the suffering in the spermatic cords, testes, and generally in the lumbar regions is sometimes so intense, combined with the depression caused by nausea and retching, as almost to prostrate the patient from exhaustion.

The local application of iodine or some of its preparations, by inunction or otherwise, of such forms as the iodide of lead or the biniodide of mercury, have been thought to be useful; but as they are generally applied in conjunction with pressure when the patient is kept in a recumbent posture, the benefit is probably quite as much, if not more, due to the mechanical action of posture and pressure, as to drugs.

A due combination of local and constitutional remedies, with rest, improved diet, and changed, *i.e.*, improved, hygienic conditions, may, and no doubt do, materially control the progress of the disease and relieve suffering. No remedy, however, is so potent as change of climate, by removal from the endemic site of the disease. This, if effected in the earliest stages, may completely arrest the disease, and perhaps, but this is doubtful, even disperse any incipient structural change that may have occurred.

This has occasionally been observed in the rare cases in which it happens in Europeans, that returning to Europe, they have after a time lost the disease, and almost, if not entirely, any hypertrophic changes that may have occurred. Natives of India improve, and the disease often ceases to progress, if they leave the endemic area during the early stages and go and reside in other and drier localities. Such a change, for example, as from Calcutta to Delhi, in the case of a native of Bengal who is affected, is often effective in arresting, if not in curing, the disease. It is constantly observed, however, that after the hyper-

trophic condition has become advanced, the paroxysms of fever are still liable to recur, even when the climate is changed, though they do so with less violence, showing that the tumour itself acts in some way as the source of a dyscrasia that perpetuates the recurrence of the febrile state, which ceases altogether after it has been removed. This, where the disease affects the genital organs, is possible. When the limbs are the seat of the disease, the practice is not applicable.

The onset of elephantiasis is frequently violent and attended with great suffering. There is high fever, intense pain in the lumbar region, the groin, the spermatic cords and testes, which become much congested and swollen, and acute hydroceles form. This is often attended with sympathetic vomiting, nausea, rapid and erythematous swelling of the external parts; and if the extremities be attacked, the swelling is often very tense and painful, accompanied by much effusion into the areolar tissue. The surface of the integument is much inflamed, and sometimes discharges a serous ichor or chyle-like fluid, according to the extent to which the lymphatics are engaged in the particular case. There is much constitutional disturbance, increase of temperature, and often depressing nausea and vomiting when the cords are implicated. In these the great tension and swelling of the cords is apt to dilate the abdominal rings so widely, that when it subsides after recovery, the patient is liable to suffer from hernia through the widened inguinal passages.

During the fever and excitement, salines and aperients, with local soothing applications, fomentations, and often opiates, are necessary to relieve pain and give rest. When this stage has passed, quinine is useful, which if anæmia exist should be combined with iron, which may be all the more necessary if other indications of malarial cachexia be present. A variety of tonics have been recommended, but there is no reason to believe that beyond their general action as tonics and antipyretics or febrifuges, they have any special action on the disease. Richards thinks that he has seen benefit result from confining certain natives of Orissa to a milk diet; but it is to be feared that even this simple form of treatment will not generally succeed.

It is impossible to overestimate the importance and value of change of climate; in the case of Europeans this should be to

Europe, in that of natives of the country to a district where the disease does not prevail—beyond damp and malaria as much as possible; and in addition all measures should be resorted to that can tend to improve the general health and the condition of impoverished blood which no doubt exists.

Surgical treatment, where the hypertrophy is advanced, is often most successful in relieving the sufferer not only of the local trouble, but also of the fever, which ceases when the outgrowth is removed, for it would seem that the outgrowth acts as a source of dyscrasia keeping up the recurrence of fever as long as it itself remains.

Tumours of the genital organs, sometimes of enormous size, are now removed with complete success, and, considering the formidable character of the operation and the magnitude of the mass—which has occasionally exceeded 100 lbs. in the male—with comparatively small mortality.

The removal of a scrotal tumour is effected by incisions along the course of the cords and the dorsum penis. The lines of incision are shown in the accompanying engraving (fig. 4). The cords, testicles, and penis are turned out by a few touches of the knife, and then reflected and held up on the abdomen, while the mass of the tumour is rapidly swept away by a few bold incisions in the perinæum. The removal should not occupy more than 2½ to 3½ minutes, unless any complication should arise from adhesion of the tubes to cicatrices, such as are often caused by the application of the moxa, which is a favourite native method of treating the disease in the early stages.

The numerous venous and arterial bleeding points should then be arrested by ligature or torsion, and the surface of the wound dressed with simple oiled lint covered with antiseptic dressing.

No attempt should be made to preserve flaps of integument either for the penis or testes. It is unnecessary, and almost certain to be followed by recurrence of the disease. The process of cicatrisation goes on rapidly, and in from two to four months all is closed in by cicatrix tissue, which gradually perfects itself with time, and has no liability to become the seat of a return of the disease.

Before commencing the operation, especially in the case of a large scrotal tumour, it is well to drain it of blood by placing

the patient on his back, elevating the tumour in the abdomen for an hour or so before the operation, during which time pressure by a bandage (a modification of Esmarch's) may be tried, and cold (ice) may be applied. During the operation the application of a whipcord ligature drawn tightly round the neck of the tumour prevents loss of blood, and it is very important that not more blood than can possibly be helped should be lost from the numerous bleeding points which are seldom controlled with fewer than twenty to thirty ligatures, often more. The shock of the removal of so large a mass is often severe, and causes

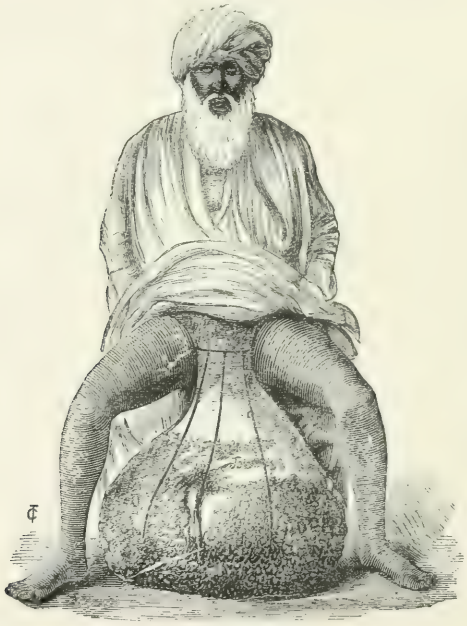

Fig. 4.

anxiety. The patient should in such cases be left on the table until reaction has thoroughly set in, and care should be taken that at or soon after this period, no hæmorrhage should occur from small vessels which during the operation may, from not bleeding, have escaped notice.

In thin persons the abdominal tourniquet may be applied.

The process of healing occupies from two to four months, but when complete is very satisfactory. The genital organs are

covered and protected, and the relief to the sufferer, who had for years been encumbered with a tumour of perhaps thirty to sixty pounds weight, may be imagined! The procreative powers are also frequently restored. Of 193 cases of scrotal elephantiasis operated on in the Medical College Hospital in Calcutta between 1859 and 1871, thirty-five, or 18·2 per cent., proved fatal, the causes of death being pyæmia, embolism (cardiac and pulmonary plugging), diarrhœa, tetanus, shock. Many of these deaths were due to insanitary conditions, and probably would not have occurred under more favourable circumstances.

The tumours removed varied in weight from two or three pounds to 110 lbs. The ages of the patients ranged from 20 to 50 years.

It has been suggested that elephantiasis of the limbs may be treated by ligature of the main artery. It is difficult to understand on what physiological principle this mere temporary starvation of the limb should have any efficacy in permanently removing the local expression of a constitutional disease. That it might temporarily ameliorate it, there is no reason to doubt, but the same effect could be produced by pressure on the limb or its artery, or by continuance in the recumbent posture; and such, indeed, has been the result of experience in certain cases in India. Ligature of the femoral artery, which was necessarily accompanied by protracted rest in bed, the application of bandages, and the general diminution in size that would follow such an ordeal, were followed by a considerable reduction in the size of the leg. The improvement, however, was temporary, and the disease returned to its original dimensions on the patient's resuming the usual mode of life.

There is probably not sufficient reason on any sound physiological principle for expecting permanent improvement in the case of true elephantiasis by merely temporarily arresting the flow, and subsequently altering its channel of distribution in the limb through the anastomotic circulation to warrant the performance of so serious an operation as ligature of the main artery, and as has been stated, the results of ligature of the femoral artery for elephantiasis of the leg failed in Calcutta to produce any permanently good result. It is not supported or confirmed by experiment.

ON THE DIFFERENCES OF ACTION OF INDUCED AND CONTINUOUS CONSTANT CURRENTS ON THE MUSCULAR SYSTEM, FROM A CLINICAL POINT OF VIEW.

BY DR. ONIMUS, OF PARIS.

(*Continued from* vol. xiv. p. 419.)

Importance of these Facts as a means of Diagnosis.

Without dilating on this question, to which the greater number of authors have called attention, and which we have fully considered elsewhere, we may remark that from the moment that we establish in any paralysis the occurrence of difference of contractility for the two kinds of currents, it may be positively stated: (1.) That the intra-muscular nerves are damaged. (2.) That the muscle is not atrophied, as the application of induced currents might lead one to suppose; but, on the contrary, that the muscular fibres are preserved, and that they have undergone only a slight alteration, which will be rapidly recovered from as soon as the nerves are regenerated.

In these cases it is certain that the lesion has primarily affected the motor nerves, and as this loss of contractility never takes place in affections of the central nervous system, or at least of the brain, the conclusion may be drawn that it is an affection of the nerve itself. The affection may occupy several parts of the nerve—either its point of origin alone, or its course, or its terminal filaments. The longer or shorter period required for the phenomena described to develop, will serve to indicate the point affected, so that, *cæteris paribus*, the more distant the primary affection is from the muscles, the longer is the time required between the appearance of the paralysis and the loss of farado-muscular excitability.

On the other hand, increase of galvano-muscular excitability indicates that the nerve-lesion is confined to the motor nerves.

It has been already stated that in peripheric paralysis of the facial nerve these phenomena present themselves quickly, and in all instances: of that there can be no doubt whatever. In many cases, it is true, the paralysis is slight and transient, but even in these cases there is always a difference between the excitability of induced and continuous currents. Induced currents may not lose their action, but continue to excite contractions; but these contractions are more difficult to excite than on the sound side. And in the same way the excitability for continuous currents may not be very greatly augmented, but it will still be more marked than on the healthy side.

In slight cases of rheumatic facial paralysis that have fallen under our observation, we have always observed five to seven days after the commencement of the affection, a difference in regard to farado-muscular and galvano-muscular contractility. In our opinion all the cases of facial paralysis that have been considered peripheric, and that have been reported as paralyses of this kind, in which the farado-muscular contractility was completely preserved, ought to be regarded as paralyses of cerebral origin. In patients in whom these phenomena are presented, in spite of the absence of other symptoms and the opinion of other physicians, we have always rejected the diagnosis of peripheric paralysis, and subsequent events have demonstrated the accuracy of our views.

We desire to draw attention to the following observation, which shows how effectively electricity may be employed in establishing a diagnosis:—A workman engaged in a foundry, while exposed to a high temperature, suddenly experienced a sensation of cramp in the left side of his face; the sensation passed off immediately, but the muscles of this side remained paralysed. He had not felt any dizziness, nor vertigo, nor loss of consciousness. He came under our observation two days afterwards, and with the exception of paralysis of the muscles of the face, had no complaint to make. We diagnosed a peripheral paralysis of the facial nerve due to the influence of change of temperature.

On examining the electrical condition, no alteration could be detected between the two sides of the face, at which, however, we were not in any way surprised, as it was only the second day of the affection.

On the day following the contractility was still the same; that is to say, induced currents produced strong contractions on both sides, and with continuous currents the same strength of current was required. We began to doubt our diagnosis, especially as there appeared to be slight impairment in the movements of the ocular muscles; but the patient declared so positively that he observed no change in his vision, that we passed lightly over these phenomena, especially as the improvement was already well marked, and we believed it to be a very slight case of peripheric paralysis, the rapid recovery from which did not allow either the muscles or the nerves to undergo appreciable alteration. Ten days after we saw the patient again, and then found that some muscles, especially those of the upper part of the face, remained paralysed, but without presenting any change in regard to their galvano-muscular and farado-muscular contractility; this fact alone led us to reject our former diagnosis, and we were compelled to admit a centric lesion. On close inquiry the patient admitted slight impairment of vision. M. le Dr. Camuset, who examined him at my request, recognised the symptoms of a paresis affecting several muscles of the eye. On the left side there was insufficiency of accommodation manifesting itself by an inability to read at the same distance as with the right, but this symptom did not continue after this date. On the right a much more marked phenomenon occurred, which consisted of a diplopia appearing when the object looked at was on the right side of the patient. When a red glass was placed over the right eye and a lighted candle was moved in front of the patient at a distance of about three yards, two images were perceived as soon as the light was moved beyond the median plane of the body towards the right; the red image was to the right, the white to the left, the distance between which gradually increased to about a foot when most separated. *Homonymous* diplopia, increasing to the right, is symptomatic of more or less complete paralysis of the sixth pair, or external oculo-motor nerve; but this paresis was difficult to diagnose at

first sight, for the eyes had preserved their symmetrical mobility almost perfectly on the two sides.

This complication implicating the movements of the eyes is a positive proof of a centric affection; and we felt that we had before us just one of those cases of which the lectures of M. Charcot, "Sur les Affections du Bulbe," might afford us aid in determining the seat. Some very limited lesion ought in fact to have existed in the upper part of the medulla oblongata, where the origins of the facial and sixth are in close proximity.

The patient has now recovered, but if the examination of the electrical contractility had not supplied a very certain sign, we should perhaps, without much hesitation, have included this case amongst those peripheric paralyses, in which faradomuscular contractility is preserved and which rapidly recover. Moreover, we entirely changed our first prognosis, for the prognosis is very different and more serious in a case of this kind, even when complete recovery takes place, than in a case of peripheric paralysis, though this may have recovered more slowly and less completely.

Causes of the Difference in the Effects produced by Induced and by Continuous Currents.

We have already referred to the physical differences which distinguish induced from continuous currents: and have nothing further to say upon this point; it will be sufficient to indicate here to what differential property the difference of excitation of these two kinds of currents is owing.

We know that the induced current is always of extremely short duration, whilst the continuous current acts for a relatively much longer period. The majority of authors attribute the difference of action of induced and constant currents to this cause. Neumann was the first to make these investigations, and he observed that if the currents proceeding from a battery are rapidly broken, the contractions are much feebler than when the current is more continuous, and that they disappear entirely when the interruptions are very rapid. Thus, in the cases where the muscles do not contract by induced

currents, whilst they preserve their excitability for continuous currents, it would appear to be due to the short duration of induced currents.

This proposition is in great part true; but we do not believe that it is the sole condition which determines the difference of action between induced and continuous currents.

We have seen, in fact, that the duration of the current may be increased without more action being obtained. In employing Clarke's apparatus, and turning the electro-magnet slowly, we produce induced currents the duration of which is less; and during the application of this current no result has been obtained when applied to paralysed muscles (facial paralysis). We have in a similar way employed the current produced by Ladd's apparatus, which when applied to the muscles of the limbs or to those of the face, when healthy, causes very energetic contractions, but does not cause the least contraction when applied to paralysed muscles.

In order to study the influence of the duration of the current with continuous current machines, we have made use, in the foregoing experiments, of the toothed wheel of Masson; but this plan has its defects, for the contacts are not always very exact; and as the wheel has to be rotated with the hand, it is not certain that the velocity is uniform. The results we have obtained by these means may therefore be erroneous. But since they were employed our experiments have been made with greater exactness, in consequence of our having adopted an apparatus with regular interruptions that we have had constructed for our studies on the pneumogastric.

This apparatus is capable of giving twenty interruptions in the second, and we have had numerous opportunities of verifying the following facts:—

The number of interruptions per second required to produce permanent contraction of the muscle is greater or less, according to the degree of paralysis present, and the period of the duration of the affection.

Thus, in order to obtain permanent contraction or tetanus of a healthy muscle, nearly twenty interruptions per second are required, whilst in paralysed muscles tetanus supervenes with eight, and even with six or five interruptions per second. In

proportion as the paralysis becomes more marked, a less number of interruptions is required; and on the other hand, when recovery has taken place, a greater number of excitations is required to produce tetanus.

This is easily conceivable, since, as we have said, the form of the contraction changes: it becomes slower, and the muscular shock has not time to be accomplished as rapidly as by healthy muscles.

Tetanus of these paralysed muscles is not so energetic as that of healthy muscles—that is to say, the shortening of the fibres is much less pronounced. This feeble degree of shortening, as well as the absence of a succession of shocks, often makes it be believed that there is an absence of contraction. This is an error that many authors, and that even we ourselves, have fallen into. Thus, with ten or twelve interruptions per second, the continuous current being employed, no effect appears to be produced, because the muscle appears to be perfectly quiescent during the passage of the current. It has hence been concluded, and we have ourselves concluded, that when the number of interruptions exceeds twelve per second, the duration of the current was too short to determine contractions. But this immobility of the muscle is only apparent, for it is due to the fusion of the successive shocks, which however do not attain the degree of shortening that occurs in the tetanus of healthy muscles. The tetanus of paralysed muscles is very feeble, and in fact is scarcely perceptible, except at the moment that the current is made and broken.

The interruptions of the continuous current must indeed be rapid if no effects are to be produced upon the muscles by it. But the point which is brought out in these researches is, that whilst the muscular shock of healthy muscles does not last longer than seven or eight hundredths of a second, it lasts from twelve to twenty hundredths of a second in paralysed muscles.

These phenomena of contraction evidently indicate an abnormal state of the striated muscular fibre—a modification of its structure and function.

In addition to the conditions that we have already described, the alteration of the intra-muscular nerve filaments and the preservation of the healthy condition of the muscular fibre—

conditions which are necessary to occasion the absence of farado-muscular contractility and the augmentation of galvano-muscular contractility—the following must also be mentioned:—1. Slow succession of interruptions of the galvanic current, and a sufficient duration of each excitation. 2. A modification of the striated muscular fibre which assimilates it to smooth muscular tissue, and in general to that of other contractile substances.

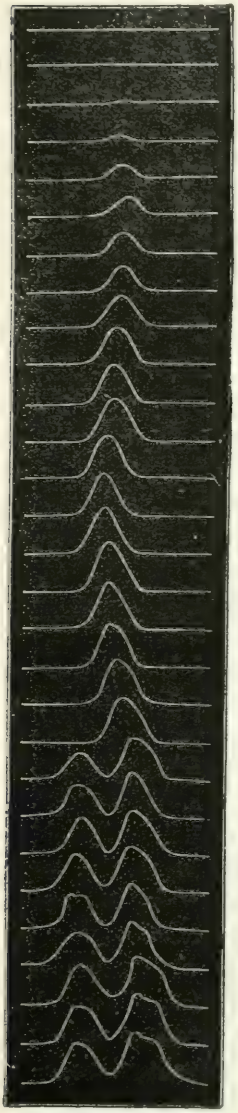

Fig. 1.

We have been able to reproduce some of these phenomena by way of experiment, and Fig. 1 is very instructive in this point of view.

We have caused a current proceeding from five small Daniell's elements to pass through the muscle of a frog, the contraction being registered on a registering cylinder revolving with mean velocity. The interruption of the current took place at each turn of the cylinder, and produced, as is seen in the nine lower lines on the figure, a contraction on the opening, and a second contraction on the closure of the current.

In proportion as the muscles become exhausted, only a single contraction occurs, and finally even this disappears. It may at the same time be observed in these tracings that in proportion as we ascend to the higher lines the commencement of the contraction is retarded.

In the three upper lines there is no longer any contraction; but if the velocity of rotation of the cylinder be retarded in such a manner that the period which intervenes between the opening of the current

and its closure is prolonged, the contractions immediately reappear. The absence of contractility is not due to the fatigue of the muscle alone, since on prolonging the interval between the periods of excitation contractions are produced, but is owing to the circumstance that at this period of muscular fatigue the exciting agent must act for a longer time. At the same time the molecular changes which bring about dynamic effects take place more slowly, and this is just the character that we have met with in cases of facial paralysis.

Induced differ from continuous currents both in tension and in quantity. Induced currents have enormous tension, but are small in point of quantity; whilst the contrary obtains in regard to continuous currents. This difference, as we have observed, influences their mode of excitation in the cases of paralysis that we have just investigated; it may be said generally that tension has *less* marked influence on paralysed than upon healthy muscles, whilst quantity has *more* action on paralysed than upon healthy muscles. With the same battery, if the surface of zinc be augmented which increases the quantity, the contractions become more energetic. With twenty-eight elements, if only a very small part of the zinc be introduced into the exciting liquid, we cause less strong contraction in paralysed muscles than when we employ a current of fourteen elements with the zinc completely immersed.

B.—*Not only do continuous currents cause the contraction of muscles when these no longer contract with induced currents, but a less powerful current is required to produce this contraction than is required to cause contraction in the homologous healthy muscles.*

The difference of reaction of the muscles in certain cases of peripheric paralysis for the two kinds of currents is certainly a most curious fact, and astonishes most physicians and physiologists, especially those who have always considered the action of induced and continuous currents as identical.

But if these phenomena admit of explanation it is more difficult to determine why continuous currents acting on these paralysed muscles, which no longer respond to induced currents, should not only cause them to contract, but should cause them to contract more energetically than healthy muscles. In accordance

with the electro-motor force, from ten to twenty elements are required to cause the muscles of the face, when healthy, to contract; whilst when these very muscles are paralysed, only five, and sometimes only two elements are required; and when the muscles are exposed, it often occurs that one element is sufficient to induce contraction.

It is erroneous to say with certain authors that the contractions are stronger here than in healthy muscles; they are, on the contrary, always less energetic; the point is, that they require a current of less intensity to produce them. If it be borne in mind that in these cases there is destruction of the intramuscular nervous filaments, and in consequence an absence of excitability through the nerves, we are led to the logical conclusion that idiomuscular contraction is determined by a feebler stimulus than is required to produce contraction indirectly through the motor nerves.

Without entering further into the particulars of these phenomena, we may remark that all these facts concur in showing that the contractile substance of striated fibres in these cases of paralysis resembles smooth muscular fibre, or that which is called protoplasm. Its contraction is slow, and it remains persistently contracted throughout the whole of the time that the current is applied, and it returns but slowly to its normal state.

It is a fact of great physiological importance, however, that continuous currents have a much more marked action upon smooth fibres than induced currents, and to provoke the contraction of the unstriated fibres a current of much less intensity is required than for striated muscles. In the experiments we have made on the contraction of the intestine, we have observed on several occasions, both with the manometer and with the registering apparatus, that when contractions can no longer be obtained with induced currents, they are still produced by continuous currents.

The trace (Fig. 2) represents the contraction of the small intestine of a dog shortly after death. The application of induced currents, either directly to the intestine or to the mesenteric nerve, produced no effect; whilst on electrifying these nerves with induced currents, the well marked contraction shown at *a*, Fig. 3, took place. On applying one of the poles to the nervous

plexus, and the other to the intestine, some peristaltic contractions even occurred.

We have already pointed out the analogy that exists between the contractions of the muscles of animal life in these cases of peripheric paralysis, and the contractions of the muscles of vegetative life: this analogy is still further borne out by the fact that whilst the striated muscles only contract at the moment of closing and of opening the current, remaining relaxed during the intermediate period, smooth fibres present a more or less

FIG. 2.

considerable shortening during the passage of the current. In other words, the same thing takes place as in striated muscles in the case where there is augmentation of the galvano-muscular contractility.

Lastly, we have seen that the muscles of the face atrophy very slowly after paralysis of the nerve, and the same holds good for the smooth fibres. These fibres also atrophy slowly; they diminish in number and volume without completely disappearing, and those which remain preserve their contractility.

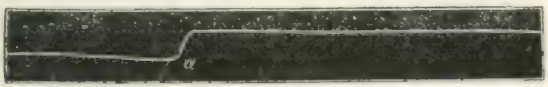

FIG. 3.

The uterus, even after years of repose, still contains fibre-cells. The seminal vesicles of old men and of paraplegic patients still present smooth fibres.[1]

A very well-marked analogy then exists between the smooth and the striated fibres, when the latter are no longer in connection with nerves. It is said that the striated fibres return by insensible gradations to their embryonic condition, for the properties of smooth muscles resemble those of striated muscles

[1] Ch. Legros and Onimus, "De la Contraction des Muscles de la Vie Végétative," in the *Journal d'Anat. et de Physiol.* 1869.

in their embryonic state. We have, in point of fact, noticed that in the case of the muscles of embryos, both continuous and induced currents excite contractions for a short time; but the excitability for induced currents rapidly diminishes and passes off, whilst it remains for some time for continuous currents. At the same time contraction produced by continuous currents is persistent, remaining during the whole period that the current is applied.

These facts help in great measure to explain the augmentation of excitability by continuous currents, for it is easily intelligible that, as soon as the contractile substance of the striated muscles changes its characters, it responds differently to excitants. As it approximates more and more to the smooth fibres, it assumes their properties, and, like them, contracts under the influence of feeble currents.

By the side of this explanation ought perhaps to be placed the fact that the muscles are more readily excited by all stimuli whenever the nervous system is weakened. It is on this account that fibrillar contractions are observed on very slight mechanical irritation after serious attacks of fever, neuritis, and the like. In these cases, each of the fibres acquires a kind of independence which permits it to contract separately and on the slightest irritation; the muscles may even contract of themselves, as is proved by the fibrillar contractions that occur in all adynamic diseases. However this may be, all these facts demonstrate, from a pathological point of view, the energetic action of induced currents on the peripheric nerves, their special action on the intra-muscular filaments, and in consequence their utility whenever it is desired to excite local contraction, or when it is wished to excite the functional action of the motor nerves, and indirectly that of the striated muscles. On the other hand, continuous currents act more particularly upon the muscular substance; they have a less lively but more penetrating action, and their influence is specially marked when we wish to excite the functional activity of the smooth fibres or that of the striated fibres, where, as occurs in pathological cases, these approximate in their characters to those of the smooth fibres.

(To be continued.)

ON THE TREATMENT OF THE DIARRHŒA OF TYPHOID FEVER.

BY GEORGE JOHNSON, M.D., F.R.S.

Professor of Medicine in King's College; Physician to King's College Hospital.

In a short paper on the above subject which appeared in the January number of the *Practitioner*, I stated that careful and long-continued observation of various and opposite methods of treatment had led me to the conclusion that the most successful treatment consists in careful nursing and feeding with a cautious regulated use of stimulants when called for, and, as a rule, abstinence from active medication. I gave reasons for my belief that although the direct effect of opium is soothing, yet that when given in sufficient doses to render the intestines torpid, it acts indirectly as an irritant by retaining the putrid morbid secretions until they decompose and give off noxious gases, which distend and irritate the bowel, and thus increase and prolong the diarrhœa.

I gave reasons for not employing such drugs as mineral acids which, in my opinion, must irritate the ulcerated mucous membrane of the intestines, causing pain and griping and increasing the diarrhœa.

Lastly, I stated that I had found reason to believe that the diarrhœa of typhoid fever is often increased by the patient's inability to digest the beef tea and eggs which are sometimes too abundantly given. I have often observed that the frequent passage of liquid fœtid stools is speedily checked by discontinuing the beef tea and eggs, and feeding the patient for a time exclusively on milk either with or without wine or brandy. As

evidence that this treatment of fever cases is not unsuccessful, I mentioned the fact that during the previous year I had had under my care in the hospital fifteen cases of typhoid fever and fourteen cases of typhus, and that not one death had occurred.

In the *Practitioner* for June, Dr. Henry Kennedy comments on my paper, and expresses his belief that "it embodies a doctrine which is most questionable, and in every way open to discussion." Be it so. I am not about to enter into a controversy with Dr. Kennedy, but I beg to suggest that his objections to my method of treatment would have more weight if he could have said that he had fairly tried it and had found it unsuccessful. In the absence of such experience I venture to say that his adverse judgment is worth very little. I have at any rate this advantage over him, that I have myself tried and have seen others follow out the methods of treatment in which he places his trust, and I have abandoned them because I have found them worse than useless. As I stated in my former paper I do *not* trust entirely to diet and good nursing. I give alcohol in various forms, chloral, quinine, and even opium when required, but not as a matter of routine or without a clear indication of their necessity.

There is but one objection raised by Dr. Kennedy which I consider to have any weight, and that is his statement that the fact of fifteen recoveries occurring in succession affords no proof that the treatment was successful—the numbers being too small to have any value as evidence. To meet this objection our Medical Registrar, Mr. Batterbury, has done me the favour to look through our records and extract for me all the cases of typhoid and typhus fever that have come under my care in the hospital during the last five years, from the beginning of the year 1870 to the end of the year 1874. The result is that there have been during that period sixty-three cases of typhoid with three deaths, and twenty-six cases of typhus with one death. As I have before stated I attribute this very satisfactory result mainly to the admirable nursing which our patients receive, and to our abstinence from all medication except such as is required to meet particular symptoms. In some of my cases the symptoms were of extreme severity. In one the temperature having risen above 107° life was saved only by the frequent repetition of the cold

wet pack, which was administered with great skill and perseverance by the then House Physician, Dr. Bomford.

Everyone whose opinion is of any weight admits the supreme importance of careful feeding in cases of typhoid fever, not only during the progress of the fever, but also until convalescence is thoroughly established. It is not so generally known or admitted that the symptoms—the intestinal symptoms especially—are often aggravated by the irritant action of such drugs as mineral acids, and by the retention of fœtid morbid secretions when the intestines have been rendered torpid by opiates indiscreetly given to arrest diarrhœa. Whether any medicine has the effect of checking the outpour of morbid secretions from the bowel into the intestines, and what would be the effect of such restraint is doubtful. It is not doubtful that the artificial retention of foul liquids and gases within the bowel must be an unmixed and often a very serious evil.

ON THE USE OF QUININE AS A GARGLE IN DIPHTHERITIC, SCARLATINAL, AND OTHER FORMS OF SORE THROAT.

BY DAVID J. BRAKENRIDGE, M.D., F.R.C.P.E.,

Assistant Physician to the Royal Infirmary; late Physician to the Royal Hospital for Sick Children, Edinburgh.

Since Binz published his famous experiments, showing the action of quinine on the white corpuscles of the blood, numerous authorities have confirmed and extended his observations. The following facts, among others, may now be regarded as established:—

1. Quinine is a protoplasm poison, and limits the number and movements of the white blood corpuscles and pus cells.

2. It prevents the pathological migration of the blood corpuscles into the tissues of the membranous and parenchymatous organs exposed to the air, both when it is given subcutaneously and when it is directly applied to the part.

3. It restrains the dilatation of the blood-vessels.

4. It is an antiseptic, and exerts a paralysing, or, in larger doses, a destructive influence on microzymes.

With these facts in view, the theoretical appropriateness of quinine as a gargle in diphtheria with abundant proliferation of micrococci, and in scarlatinal, and various other forms of sore-throat, especially when attended with membranous exudation, pultaceous secretion, or ulceration, is apparent. For it antagonises all the visible factors of such forms of inflammation.

Before employing it for this purpose, I was familiar with the

use of solution of quinine as a dressing in bed-sores and other tedious ulcers. The marked diminution in the secretion of pus and the rapid improvement which I observed to take place in these cases when so treated, first led me to anticipate good results from quinine as a gargle.

For the last four months I have treated every suitable case of sore-throat that I have met with in my wards in the Royal Infirmary and elsewhere, with a gargle composed, as a rule, of two grains of sulphate of quinine and five minims of dilute sulphuric acid to each ounce of water. Sometimes I have been able to increase the strength; sometimes I have been compelled to diminish it. When well tolerated, the stronger it is the better.

The results I have obtained fully confirm my favourable anticipations. From a considerable number of cases I draw the following conclusions:—

Simple non-syphilitic ulcers of the throat, under this treatment, at once assume a healthier aspect and heal rapidly.

In syphilitic ulcers, the local treatment has always been accompanied by the internal administration of iodide of potassium, or some other suitable constitutional remedy; but my impression is that, in these cases, the cure is hastened by the quinine gargle.

Its effect in the sore-throat of scarlatina is very marked, the pultaceous secretion being checked, and the inflammatory swelling diminished.

It is of comparatively little use in the early stage of cynanche tonsillaris, over which tincture of aconite, in minim doses frequently repeated, has so decided a control. When, however, abscess followed by abundant discharge of pus results, its beneficial influence in checking the suppuration and promoting healing is marked.

In the slighter forms of diphtheritic sore-throat it answers admirably, preventing the extension of the disease, and promoting the separation of the membranous exudation.

It is, however, in severe cases of true diphtheria that I hope it will prove most useful. I have now employed it in three cases of this disease, and in all the result has been highly satisfactory.

I select the following case, because it was one of unusual severity:—

Mrs. K., a widow, 25 years of age, previously healthy, passed an open drain on Feb. 5th; remarked the bad smell at the time, and said to her sister, "I am sure I have caught something." Complained of slight chilliness for several days until Feb. 9th, when she was seized with sickness, headache, vomiting, and rigors. Did not feel the throat sore until the 10th, on the afternoon of which day I first saw her. She was in the dining-room, dressed, and sitting on the sofa, and had a haggard and very anxious look. Pulse 140, very weak. Tenderness and swelling at the angles of the jaw, and down the lymphatic glands of the neck on both sides. Tongue furred, and breath very offensive. A foul, ragged, yellowish-grey patch, about the size of a florin, covered the right tonsil. The arch of the palate, uvula, and fauces were of a dark livid red colour. Ordered to bed, to take 10 grains of chlorate of potash every three hours, and to gargle the throat with Condy's fluid (a tea-spoonful to a tumblerful of water) every half-hour night and day. Milk, beef-tea, sago, and arrow-root to be taken freely.

Feb. 11.—Less anxious expression. Pulse rather firmer, 120. Diphtheritic patch cleaner-looking and less offensive; but has extended about two lines up towards the uvula.

Feb. 12.—A new patch has appeared on the left tonsil, and another at the back of the pharynx, and there is great pain in swallowing. Temperature 103°. Pulse 130. Bowels regular. Beef-tea and milk taken in considerable quantities.

Ten drops of tincture of perchloride of iron to be added to each dose of the chlorate of potash.

Feb. 13.—Very great pain in swallowing, chiefly on the right side, left and posterior patches extending, right separating. Uvula still free. Temperature 102·2°.

Feb. 14.—Still great pain in swallowing. Diphtheritic patches have extended considerably on the left side; that on the right tonsil has separated to-day. Pulse 120. Has been able to take a considerable amount of nourishment.

Medicinal treatment has been steadily carried out. Has slept between the periods of gargling pretty well up till to-day. Ordered three glasses of port wine in the day.

Feb. 15.—Had a restless night. Great pain in swallowing, and the food returns partially by the nostrils. There has been a slight discharge from the nostrils, with tenderness, from the commencement of the disease; it is now sanio-purulent, and acrid. The diphtheritic membranes are still very firmly adherent, and are gradually extending. They now cover all the posterior surface of the pharynx, extending on the left side over the tonsil and left side of the uvula. The right tonsil is clean, tender-looking, and presents a cup-like appearance where the false membrane has separated.

The following gargle was ordered to be used alternately with the Condy's fluid every half hour:—

R. Quiniae Sulphatis, gr. xviii.
Acidi Sulphurici diluti, ℥xlii.
Aquam ad ʒvi. misce.

This at first produced retching, and had to be diluted with an equal amount of water. A gradual return was made in a few hours to the full strength, which was afterwards well borne.

Feb. 16.—Decided improvement. A good many portions of the false membrane have become detached during the night. Pulse 100, and of better strength. The tongue is cleaner, and the swelling of the throat is much less. The swellings at the angles of the jaw have quite fallen, and the throat altogether looks better. Patient attributes the improvement to the new gargle; has had a good night. She fancied and enjoyed a cup of tea this morning for the first time.

Nine o'clock, p.m.—A good many shreds of false membrane have become detached during the day, and the whole affected surface looks healthier. Considerable pain attended the separation of the sloughs during the afternoon. Temperature 100·4°. Pulse 108.

From this date the throat symptoms steadily and rapidly improved; and on the evening of the 18th the diphtheritic false membrane—the last trace of which was seen in the forenoon hanging loosely from the posterior surface of the pharynx in the middle line—had entirely disappeared.

The paralysis of the veil of the palate, which commenced on Feb. 15, culminated in general paralysis of great severity and

duration, from which the patient is only now (June 16) slowly recovering.

The intensity of the poison must have been great. On the first day of the disease, a little girl, residing in the house, was sent away to the village of Dunoon, on the Clyde, to be out of danger. She escaped herself, but carried the poison to a younger sister of the patient (Mrs. K.), who took the disease and died after six days' illness.

I have found the quinine solution useful as a wash in aphthæ, stomatitis, and other affections of the mouth; but my experience of it in these cases has been limited by the difficulty attending its use in childhood, owing to its very bitter taste.

ON GELSEMINUM SEMPERVIRENS IN THE TREATMENT OF ODONTALGIA.

BY JAMES SAWYER, M.D. LOND., M.R.C.P.,

Physician to the Queen's and Children's Hospitals, Birmingham.

I DESIRE to record my testimony in favour of gelseminum as a remedy for odontalgia. The drug is not very generally known to English practitioners, although it has been long in use in America.

Gelseminum sempervirens, the yellow jasmin, or woodbine, belonging to the natural family *Apocynaceæ*, grows plentifully in the Southern States of North America. The root, the part used in medicine, is sent to England cut up into small pieces, and these are of a brownish colour externally, of a greyish colour on section, from half an inch to two inches in length, and about a quarter of an inch in thickness. Several fatal cases of poisoning by gelseminum have been recorded. Death seems to have arisen from asphyxia, resulting from paralysis of the respiratory muscles. The drug appears to act mainly upon the nervous system, impairing the sensibility of the sensory nerves.

The dose of the powder of the root is from one to two grains. I have always used a tincture prepared according to the following formula, for which I am indebted to Mr. Dewson of this town:—Take of gelsemin root, in coarse powder, two ounces; of rectified spirit twenty fluid ounces. Moisten the powdered root with ten ounces of the spirit, and allow the mixture to stand for twenty-four hours. At the end of that time pack in a percolator, and add the remaining ten ounces of spirit. When

the fluid has ceased to flow, remove the contents of the percolator and press them. Add the pressed liquid to that obtained by percolation, filter, and make up with rectified spirit to a pint. Eleven minims of the tincture are equal to about one grain of the root. The tincture contains only a trace of tannin, and may be given with any of the preparations of iron.

I have rarely found gelseminum fail to give decided and lasting relief in cases of neuralgic pains in the face and jaws, associated with carious teeth. I have usually given fifteen minims of the tincture every six hours.

Reviews.

Practical Examination of Urine. By James Tyson, M.D. 8vo. pp. 182. London: Trübner and Co.

In the preface the author modestly apologises for adding another to the many text-books already existing on the examination of the urine. The book itself, however, is his best apology; for long familiarity with the subject and experience in teaching it to students have enabled him to produce a work in which the various methods of examining and analysing urine and urinary deposits are given briefly, but quite as fully as is necessary for the wants of the practitioner, and so lucidly that one may readily find in it the answers to difficult problems which he has been unable to solve by the aid of larger treatises.

Lectures on Pathological Anatomy. By Samuel Wilks, M.D., F.R.S., and Walter Moxon, M.D. Second Edition. Churchill, 1875: pp. 672, with seven lithographic plates.

Manual of Pathological Anatomy. By Charles Handfield Jones, M.D., F.R.S., and E. H. Sieveking, M.D. Second Edition; revised, enlarged and edited by J. F. Payne, M.B. Churchill, 1875: pp. 871, with 195 woodcuts.

Though not directly connected with the subjects to which this journal is devoted, the science of pathology is so interesting to all who are engaged in the practice of therapeutics, that no apology is needed for introducing these two important works to our readers.

It speaks well for the profession in England that the same publisher should be able to bring out two such volumes at the same time. Both are called second editions, but both have been so much altered and enlarged by the younger editors that they are practically new books.

Dr. Wilks's Lectures, published in 1859, were brief and unpretentious in plan and extremely careless in style; in fact, much of the volume was little more than a *catalogue raisonné* of the splendid pathological museum of Guy's Hospital. But there was something very attractive in the colloquial manner; every page showed thorough knowledge of the subject from

practical work in the dead-house, and some of the passages, as those on phthisis, on emphysema, on Bright's disease, pyæmia, and tumours, were models of thoughtful study. The present volume is more than doubled in size, and has not only been revised and completed throughout, but entire sections have been re-written. The seven lithographic plates, illustrating the histology of tumours, are reproductions of the beautiful drawings by Dr. Moxon which were published in the Guy's Hospital Reports for 1872-3. In their present form these lectures are full of interest; the writers speak from the full stores of their own experience, and at the same time with adequate knowledge of the progress of pathology in Germany as well as in England. There is at times, perhaps, a too exclusive citation of authors belonging to their own school; but the fault, if fault it be, is not an ungenerous one; and in one illustrious instance no more than bare justice is done to the transcendent services of their *capo scuola*, the late Dr. Addison, not only in the discovery which will be always associated with his name, but in contributions to the pathology of pneumonia and of phthisis, and in the recognition of that remarkable condition which has been named pernicious or idiopathic anæmia. The only criticism we feel called on to make on this volume is that there is a great want of historical and bibliographical references. Such terms as tubercle and adenoma need explanation if they are not to mislead, and some reference to authorities at the end of each section would have added little to the bulk of the volume, and would have made it the most complete, as it is certainly the most able and original, work on the subject.

Dr. Payne's edition of Jones and Sieveking's Manual is a most learned and accurate book; full of well-chosen references, never introduced for display but for use, clear and thorough in details, and well illustrated by excellent woodcuts, of which the histological ones are almost entirely due to the editor. With less character and colour than Wilks and Moxon's Lectures, it is so judicious and impartial as to leave no room to regret the absence of more decided or more dogmatic opinions. The former part, on general pathology, which has been least altered, is not perhaps equal to the larger portion on the morbid anatomy of the several organs; and in some places the new garment does not perfectly match with the old. Dr. Handfield Jones represents the generation whose pathology was largely humoral, chemical, vital, or even metaphysical; while Dr. Payne is no exception from the rule which makes all younger pathologists incline to the solidist school, prefer mechanical to more subtle explanations, and believe only half that they hear and not all that they see. Probably he would have produced a more entirely satisfactory book if untrammelled by working on one

already written; but in spite of this inherent drawback, the work has so many merits that it is probably the best handbook on the subject for students and for practitioners.

We have no space for quotations which would do justice to these two excellent works; but would recommend those who take up the "Lectures" to begin with the admirable chapter "on the Association of Morbid Conditions," which closes the volume; and those who read the "Manual" to choose as a specimen the clear and masterly discussion of the pathology of pneumonia and of phthisis.

On Paralysis from Brain Disease in its Common Forms. By H. Charlton Bastian, M.D., F.R.S., &c. London: Macmillan and Co. 1875.

THIS book is the publication in a separate form of lectures which have already appeared in the pages of the *Lancet*. The subject on which Dr. Bastian writes is surrounded with difficulties, and is one which, perhaps, more than any other, is at present engaging the attention of physiologists and physicians. Dr. Bastian shows himself thoroughly able to deal with it, and he has written an excellent book. He first treats of the causes of hemiplegia, then of the signs and symptoms, and of the means of arriving at a regional diagnosis. The nature of the lesion or pathological diagnosis is next considered, and lastly, the principles of prognosis and treatment. The causes of hemiplegia are briefly discussed under the heads of rupture, occlusion, and spasm of vessels. In relation to these points Dr. Bastian gives a careful analysis of the works of Heubner and Duret on the vascular supply of the brain, thoroughly appreciating the value of such minute anatomical details in our efforts at advancing in a knowledge of regional symptomatology.

The modes of onset of hemiplegia are considered under the heads of the apoplectiform, the epileptiform, and the simple mode of onset. The character of each is carefully described, and the facts of clinical experience are viewed in the light of recent investigations into the functions of the brain by Hitzig and Ferrier.

The recent researches of Bourneville in regard to the variations of temperature in the apoplectic condition are duly considered, and their significance indicated. The usual symptoms of a hemiplegic attack are fairly discussed, and an excellent chapter is devoted to the cause of the exemption of certain sensory and motor functions in unilateral brain lesions.

Dr. Bastian rejects the common view that the sensory tracts converge in the optic thalamus, and believes that the facts of clinical experience are in opposition to it. On this point Dr. Bastian might have been a little more explicit, and we think

that the grounds of his opinion are not so stable as he seems to regard them. A chapter is devoted to the alteration of nutrition consequent on hemiplegia. Many of these Dr. Bastian, we think, rightly attributes to secondary degeneration of the spinal cord consequent on the original brain lesion, and not directly caused by it. In discussing the functional difference between the two hemispheres the pathology of aphasia is considered, and on this Dr. Bastian writes with authority.

The differential diagnosis of the seat of lesion is given with as much precision as the present state of our knowledge will allow. Our author is of opinion that the posterior lobe of the brain is more concerned with the intellectual faculties than the anterior, and agrees with Hughlings Jackson in the opinion that mental impairment is more frequently associated with lesions of the posterior lobe than with any other part of the brain.

On this subject, however, there is room for considerable discussion, and Dr. Bastian wisely writes with caution. Diseases of the cerebellum are fairly treated, but we think they might have been discussed more fully. Dr. Bastian is careful to distinguish between the direct and indirect effect of lesions of the cerebellum, and we think his observations on cerebellar disease are of considerable value. Some excellent practical directions are given for the differential diagnosis of the cause of coma, a subject of no small importance when considered in the light of recent occurrences and mistakes. The chapter on prognosis is carefully written, and the treatment of hemiplegia is judiciously handled.

We heartily commend the book to our readers.

Issue of a Spirit Ration during the Ashantee Campaign of 1874. By E. A. Parkes, M.D., F.R.S. 8vo. pp. 63. London: Churchill.

There are few things more important in practical medicine than a knowledge of how and when to give alcohol, and the medical profession certainly owes Dr. Parkes a deep debt of gratitude for the light thrown on this subject by his experiments. It is always satisfactory, however, to have the results of experiments made on a few men tested by the experience of numbers, as any fallacies are almost sure to be thus detected, and no better evidence could be afforded of the care and exactitude with which Dr. Parkes's former experiments were carried out than the complete confirmation which the conclusions he drew from them have received from the observations made during the Ashantee campaign upon the effects of alcohol on the troops. These showed that total abstinence improved the health, and that alcohol, though apparently beneficial when given with food after the day's

march was done, was injurious while on the march, the reviving effect passing off after, at the utmost, two and a half miles' march had been accomplished, and being succeeded by languor and exhaustion as great or greater than before. When again resorted to its reviving power was less marked; and its narcotizing influence was often traceable in the dulness, unwillingness to march, and loss of cheerfulness of the men. Meat extract, on the contrary, in quantities of not less than half an ounce at a time, was not only powerfully reviving, but sustaining, and so was coffee, though to a considerably less extent. This evidence in favour of meat extracts is of great value at the present time when their power to act either as food or stimulants is so much disputed. The sustaining power of thin gruel, made from boiled oatmeal, during heavy work is well shown in one of the appendixes. This agrees perfectly with the observation of Alpine travellers, that small quantities of food at short intervals prevent exhaustion, and with our own experience that, although unaccustomed to exercise, we could carry a knapsack for thirty miles a day without fatigue by simply taking something to eat every two hours.

Although Dr. Parkes's report has been published in the *Lancet*, many will be glad to have it in a separate form; and the appendixes and introduction, which form one-half of the present little volume, add greatly to its value. We recommend its perusal not only to army surgeons, but to every one interested in the use of alcohol.

Clinic of the Month.

The Elastic Ligature for the Cure of Webbed Fingers.—One of the comparatively few instances in which the elastic ligature of Prof. Dittel becomes a real addition to our surgical appliances is illustrated by a case reported by Dr. M. Vogel, of Eisleben. The child was one of twins, three months old and puny. The deformity was symmetrical on the two sides and consisted in a complete union between the third and fourth digits, which were exactly equal in length. On the dorsal aspect the skin passed continuously without a furrow from one finger to the other. The nails were much curved on the outer sides, but at the contiguous parts they were smoothed off. On the posterior aspect the fingers had only one tip without any appearance of a division, and the folds opposite the joints were common to the two. The joints were freely movable, and there was in addition a slight lateral mobility in the neighbourhood of the middle articulations, but the terminal phalanges were united by a broad piece of bone which passed from base to base. The hands were altogether diminutive. This was a difficult case to deal with, not only because of the bony union between the two phalanges which it would have been a difficult matter to divide, but also because from the thickness of the web an operation with the knife would have necessarily left a very wide raw surface. He accordingly determined to make an attempt with the elastic ligature, of the efficiency of which he had already convinced himself. The first indiarubber thread was entered just above the last phalanx, and was tied over the tip of the united fingers, care being taken that it occupied an exactly intermediate position between them. At first, no inflammatory disturbance resulted, but after a few days, slight suppuration set in, accompanied by a little feverishness, and after eight days the phalanges, bones and all, were completely separated from one another, the resulting wound being only half the width of that which would have followed a cutting operation. During the process the ligature required tightening by placing a small roll of paper under it, over the tips of the fingers. The remainder of the web was divided by one ligature, which, however,

required frequent tightening. It was complete in five days, but during this period there was considerable inflammation of the parts, with a good deal of fever, and a small abscess formed on the fourth finger, which required opening. Afterwards the two fingers were separated, and fixed with plaster on a pasteboard splint; and cicatrisation went on rapidly: while, to prevent the re-formation of the web at the junction of the fingers, an elastic thread was attached to a band placed round the wrist, and gently stretched between them. After a few weeks the fingers, though still somewhat deformed, had so far regained their natural appearance that the minute scars on the contiguous sides required a careful search for their discovery. The operation on the right hand was almost an exact repetition of that on the left; but here no inflammation of importance was set up, which may be attributed partly to the fact that each pair of phalanges were divided separately in consecutive operations, and also that salicylic instead of carbolic acid was used as a dressing. (*Medical Times and Gazette*, May 15, 1875.)

The Influence of Occupation on Disease.—Dr. Balmanno Squire has collected and arranged statistics of the cases of skin disease that have come under his notice during the past five years in the East and West Branches of the British Hospital for Diseases of the Skin; the one branch being situated in Finsbury Square, the other in Great Marlborough Street. The two registers have always been carefully kept, and being at a considerable distance apart, the influence of local trades and occupations is neutralised. The results were obtained by dividing the number of persons engaged in each occupation in London, as ascertained by the Census of 1871, by the number of patients of each occupation respectively that attended the hospital. The results of course show only the comparative liability to skin disease of the several occupations. A mean of liability, by which the following statistics may be absolutely gauged, is arrived at by dividing the total number of the male population in London by the total number of males attending the hospital during the last five years. This process gives a mean average liability in the case of males, as applied to these tables, of 1 in 70. The same process applied to the case of females, gives a mean liability of 1 in 100. The following are only some of the occupations given by Dr. Squire:—Leather-cutters, 1 in 7; weavers, 1 in 14; dyers, 1 in 16; gardeners, 1 in 20; warehousemen, 1 in 28; clerks, 1 in 31; carvers and gilders, 1 in 33; wood carvers, 1 in 33; railway servants, 1 in 36; bookbinders, 1 in 39; travellers, 1 in 44; brass-workers, 1 in 50; tailors, jewellers, printers, masons, and bakers, all between 1 in 50 and 1 in 60; grocers, musicians, hair-dressers, smiths, and postmen,

between 1 in 60 and 1 in 70; tanners, porters, cabmen, cigar-makers, and engineers, between 1 in 70 and 1 in 80; painters, opticians, barmen, and coopers, between 1 in 70 and 1 in 80; gunmakers, watchmakers, hatters, and labourers, between 1 in 90 and 1 in 100; domestic servants, 1 in 109; police and boot-makers, 1 in 114; corkcutters, ironworkers, and plasterers, 1 in 124; soldiers and sailors, 1 in 125; dairymen and butchers, 1 in 133 or 135; bricklayers, 1 in 165; carmen, 1 in 191; builders, 1 in 202; costermongers, 1 in 324; artists, 1 in 550; and plumbers, 1 in 702.

In the case of females:—Box-makers, 1 in 32; needleworkers, 1 in 36; schoolmistresses, 1 in 68; tailoresses, 1 in 91; charwomen, 1 in 103; milliners, 1 in 119; cooks, 1 in 129; domestic servants, 1 in 136; nurses, 1 in 192; laundresses, 1 in 231. It does not appear, therefore, that some of those occupations usually regarded as the most unhealthy really render those who follow them materially more liable to cutaneous affections than otherwise. (*Medical Times and Gazette*, May 22, 1875.)

Etiology of Hysteria.—Dr. James Anderson, in a paper read before the Medico-Chirurgical Society of Glasgow, believes hysteria to be the result of a certain degree of mental incapacity, the manifestation of a mental weakness or derangement. This alone, he thinks, can account for the infinite variety of phases which the disease presents. Impressions which usually pass by unheeded are carefully caught, and brooded over and magnified; and certain sensations which are to a healthy mind indifferent, *i.e.*, which require "attention to the operations of our mind to become conscious of their existence," become sensations disagreeable, because the necessary attention is given to them. The view that hysteria is a form of mental derangement explains how it is that one patient may by her example set others into a similar condition, and Dr. Anderson argues that if hysteria depended on any morbid condition of a particular organ (except, of course, the brain) a far more definite train of symptoms would be associated with the disease, and if such lesion were the cause, he should certainly expect that direct treatment would be serviceable. Again, he observes, that if hysteria depended upon some uterine affection, he should surely be able to make out the lesion in most instances; or, given the lesion, find hysteria a more usual symptom, but this is not the case, and he has himself been struck with the total absence of anything like hysteria in genuine uterine complaints, and in the majority of hysterical cases, with the complete absence of any disorder of the generative organs. Then, too, if this kind of affection were a primary cause, should we not expect to find it exerting something like a hereditary influence? But who would think of saying that Mrs.

—— is hysterical, but it is in the family, her mother and aunt were the subjects of prolapsus uteri and dysmenorrhœa respectively? Yet we should not be surprised to hear that one suffered from epilepsy, and the other from occasional attacks of mania. Further, it is said that at puberty the liability to hysteria begins, but with the exception of idiocy, we may say almost as much of any mental disorder. The exciting causes of hysteria are, however, innumerable, and any shock to the nervous system may bring on a severe hysterical seizure. In this way disorders of the uterus and sexual system may become an exciting cause of the disease. (*British Medical Journal*, June 26, 1875.)

Sterility from Anteflexion of Uterus and Stricture of internal Os Uteri.—Dr. Heywood Smith considers that of all the causes of sterility depending upon malposition of the uterus that of anteflexion is the most common. Other malpositions of the uterus except marked retroversion, leave the cervix uteri depending into the posterior original *cul de sac* in the dorsal decubitus; but in acute (as regards the angle) anteflexion the os uteri is lifted out of the posterior *cul de sac*, and placed in a position unfavourable for the reception of the seminal fluid. Anteflexion, dysmenorrhœa and sterility are then conditions so frequently associated, that when a patient comes complaining of dysmenorrhœa, and is also barren, a vaginal examination more often reveals anteflexion than any other condition. It is the dysmenorrhœa that causes the patient to seek for advice. In the lower classes relief is seldom sought for barrenness, whereas it is frequently sought for by the better classes. Dr. H. Smith gives a case in which the patient, æt. twenty-nine, had been married six years. The catamenial period was accompanied by pain, which was relieved by the passage of a thick sound. Dr. P. Smith's dilator was introduced, and a constriction existing at the internal os was divided bilaterally, and Greenhalgh's spring metallic stem was left in the uterus. In a fortnight after, having been in the meantime extended, it was withdrawn. Nearly a year afterwards she was seen again. The external os was divided a little more freely, and the spring stem introduced and worn for three weeks. After this, a thick sound was occasionally introduced, and at length conception occurred, and she was delivered in due time of a living child. (*British Medical Journal*, July 3, 1875.)

Treatment of Obstinate Sickness during Pregnancy.—Dr. Henry Bennett calls attention to chronic inflammation of the body or of the neck of the pregnant uterus as being a very important and a very frequent cause of vomiting in pregnancy; he thinks that it may always be suspected when sickness proves

unusually severe and intractable, and that no practitioner is justified in continuing to treat by medicine without making a most careful ocular and digital examination of the uterine organs. Ulceration generally accompanies the inflammation, and the granulations are large and fungoid, bleeding easily when touched. The examination made should be thorough. In regard to the treatment, as soon as under the influence of local surgical treatment, emollients, astringents, caustics, &c., the inflamed surfaces assume a healthy hue; the uterine sickness ceases, and when they become healthy it disappears or assumes its usual mild form. Dr. Copeman, of Norwich, supports a statement made by Dr. Graily Hewitt, to the effect that obstinate vomiting in pregnancy is due to displacement or flexion of the uterus, though he does not believe such flexion is the only condition which gives rise to the vomiting. He gives a case in which, when the vomiting had proceeded till there was danger of starvation, he detected on examination a decided *retroversion* of the uterus, which he rectified and prescribed oxalate of cerium. The sickness soon ceased, and the patient went on well. His opinion at the time was, that the headache, pelvic, and bearing down pains were relieved by putting the uterus into a natural position, and that the sickness was stopped by the oxalate of cerium, but from Dr. Hewitt's observations, he now thinks it highly probable that the retroflexion was the cause of all the trouble and its rectification the cure. (*British Medical Journal*, June 12th and May 15th, 1875.)

Puerperal Fever.—An interesting debate has recently taken place at the Obstetrical Society on the relation of puerperal fever to the infective diseases and pyæmia. It was opened by Mr. Spencer Wells, on April 17th, who commenced by referring to Dr. Arthur Farre's definition contained in the "Nomenclature of Diseases," which is, that "Puerperal fever is a continued fever communicable by contagion, occurring in connection with childbirth, and often associated with extensive local lesions, especially of the uterine system." To this definition this very important note is added, "In returning cases of puerperal fever the more important local lesions, such as peritonitis, effusions into serous and synovial cavities, phlebitis, and diffusive suppuration, should be specified." Mr. Wells dwelt upon the word *often* in the above definition, and asked whether the members of the society had ever seen a case of puerperal fever which could not, on careful inquiry, be traced to exposure of the patient to some one or other of the contagious or infectious fevers, scarlet fever, diphtheria, small-pox, &c., and if not, whether the puerperal was not a traumatic or surgical fever, erysipelas, pyæmia, or septicæmia, and whether all the results of these could arise in a healthy

woman placed in favourable conditions, if she had not been exposed to morbid poison. He then proceeded to ask that, assuming there is a form of continued fever communicable by inoculation or infection, how can its spread be checked, what relation have bacteria to it, and what is the value of antiseptics. Dr. Leishman, the first speaker, stated that he had of late years become more and more convinced that a large proportion of cases of puerperal fever have their origin in pyæmic or septicæmic infection. There are other cases, however, in which a patient in the puerperal state unfortunately becomes the subject of diseases of specific origin as happens with scarlet fever, and there are still others in which it would appear that the original symptoms are those of a local inflammation, metritis or peritonitis, localized or general.

Dr. Newman held that there is no such thing as a definite puerperal fever so called. In a large number of instances in which he had had the opportunity of making the investigation, he had found a distant though definite link in the occurrence of possible transmission to the patient of some definite infecting poison. He thought the mental conditions which commonly associate themselves with pregnancy should not be overlooked as constituting powerful predisposing causes to disease, and as modifying the course of the febrile symptoms.

Dr. Braxton Hicks stated that in eighty-nine cases he had found that more than three-fourths had been connected with animal poison, including decomposing material from the uterus, and half of these were connected with scarlet fever, and that in the remaining cases, though no definite history could be obtained, yet they presented no points of distinction from the foregoing cases. Some of them were, no doubt, due to mental conditions, and others were of traumatic origin and due to bruised tissues.

Mr. Jonathan Hutchinson thought that many cases of puerperal fever were due to erysipelatous or other infection, the poison being introduced from without, whilst others were due to septicæmia or poisoning of the blood, induced by inflammation of the patient's own tissues.

Dr. Richardson pointed out the peculiar condition of the blood in puerperal women, and was of opinion that we *cannot* positively state either from experiment or from observation, that there is any such thing as a special poison belonging to the puerperal state, or a special poison creating puerperal fever. Dr. Barnes did not see his way to discard the term puerperal fever, but divided its causes into those entering from without and those arising from within, and he thought the peculiar condition of the patient after childbirth was the cause of her liability to febrile affection. Dr. Squire maintained that there *is* a fever after childbirth caused by a morbid poison, communicable

by infection, and that it is not identical with the fever caused by infection of scarlet fever or any other acute infectious disease. Dr. Brunton had not found the poison of contagious diseases so productive of puerperal fever as had been stated by many speakers. He thought it was simply autogenous; that it begins in the uterus of the female who has very lately had hæmorrhage or is weakly, and that there is an imperfect contraction of the uterus; a clot remains, that clot decomposes, and the pyæmic poison is produced. Dr. Graily Hewitt thought that puerperal fever is essentially a form of blood-poison. Dr. Arthur Farre stated that he was not aware of any form of contagious or infectious fever connected with childbirth, which is distinctly caused by a special morbid poison (if by that is intended a specific virus) and which has a definite progress. Dr. Wynn Williams and Dr. Tilt alike thought that too little weight had been laid on the autogenic origin of puerperal fever in the discussion. The latter dwelt strongly on the importance of intra-uterine injection in the case of fœtid lochia. Dr. Fordyce Barker submitted the following propositions to the meeting: 1. That the clinical phenomena of puerperal fever are quite different from those of surgical septicæmia or surgical pyæmia. 2. These affections do occur in puerperal women, and the result is a disease which does not constitute a continued fever communicable by contagion. 3. When either of these affections complicates puerperal fever, it modifies the clinical phenomena by symptoms which can be distinctly appreciated and accurately described. Dr. West considered that we had not advanced far, if at all, beyond the conclusions laid down by Dr. Ferguson, that the phenomena of puerperal fever depend upon a vitiated state of the fluids, and that in the condition of a woman in the puerperal state, such a vitiated state of the fluids is specially apt to arise. Dr. Snow Beck appears to think that the symptoms of puerperal fever are essentially due to the introduction of infecting matters either from within or from without. (*Lancet*, April, May, June, July, 1875.)

Extracts from British and Foreign Journals.

Transfusion.—J. Casse, in a memoir published by the Académie Royale de Médecine de Belgique, not only gives the results of a few experiments on man, but also of a number of experiments made in the Veterinary School at Brussels. He also gives a good historical sketch. He recommends the use of warm defibrinated blood, ascribing the chief value to the blood-corpuscles, and thinking the fibrin to be unessential. The fibrin, moreover, is quickly reproduced in the circulating blood, so that the blood of the patient undergoes only transient alteration from the injection of defibrinated blood. M. Casse injected defibrinated blood at various temperatures, namely, at 3°, 10°, 27°, 47°, 50°, and 55° C., and took the temperature in the rectum. On injection of blood at low temperature, the temperature of the body generally fell, and subsequently rose, the more strongly the lower the temperature. If blood were used warmer than that of the animal receiving it, the temperature of the latter rose considerably, but the change of temperature was not so considerable as when cold blood was injected. If the blood injected was of the same temperature as the animal, the least amount of change occurred. No ill effects resulted from allowing the temperature of the blood to fall to that of the room; and even in the case of man, blood at a considerably lower temperature was injected without obvious disadvantage. In reference to the point where the transfusion should be effected, he is in favour of the veins, and mentions especially the insuperable difficulty that often occurs in driving the blood into the peripheral branches of an artery, as well as the danger of causing inflammation, and even pyæmia, which may follow arterial transfusion if rupture of the vessels and extravasation of blood happen to take place. In regard to the quantity of blood to be injected, he has shown that it may be greatly increased and even doubled in volume without injuring the health of the animal. The freedom of the respiratory apparatus from all trouble during and after injection is a point of interest. The liver, on the contrary, becomes gorged. The brain was anæmic. The method of transfusion he preferred was simply the intro-

duction of glass canula into the veins of the receiver; the blood, warmed and defibrinated, being injected by a syringe through a piece of tubing attached to the glass. Repeated injection of defibrinated blood into a healthy animal diminished its weight quicker and more persistently than even the entire withdrawal of all food; and on this ground M. Casse suggests that it might prove serviceable in polysarcia. (*Centralblatt f. Chirurgie*, 1875, No. 15.)

The Effects of direct Faradisation of the Ventricles of the Heart in the Dog.—Vulpian has recently experimented upon the effects of electrical stimulation of the heart, which are of interest in view of treating cases of sudden syncope (as in chloroform poisoning). He either stuck needles into the heart through the chest-walls or opened the thorax and maintained artificial respiration, at the same time transmitting powerful shocks of an induction current through them. Even when the electrodes were only plunged into the right heart, lively twitchings immediately occurred in both ventricles, which recurred for four or five minutes and then subsided into quiverings of the fibrils. After the lapse of about five minutes the ventricles passed into permanent diastolic relaxation. These phenomena were observed when the contact of the electrodes did not last longer than one or two seconds, and were observed alike in chloralised and curarised animals. On the cessation of the fibrillar contractions, the heart was unexcitable by any stimuli, either direct or indirect. Neither section of the pneumogastrics nor the antecedent administration of atropin made any difference; and Vulpian therefore concludes that the effects observed were due to the direct action of the electric current on the cardiac muscle. Further, the same succession of events occurred when only one electrode was inserted into the heart and the other was placed on the skin or in some adjacent part. He considers that the electric current conditions a kind of spasm of the musculature of the ventricle, by which it is prevented from reacting in the ordinary co-ordinated manner to the motor impulses proceeding from the cardiac motor ganglia. The cramp-like tremblings probably rapidly exhaust the rapidity of the heart. When the spasm has ceased, the action of the ventricle can no longer be excited through the nerves. These experiments therefore show that the direct application of electricity, especially of strong currents, to the heart in cases of chloroform narcosis is a very dangerous, if not certainly fatal, proceeding. (*Brown-Sequard's Archiv de Physiologie*, 1874, p. 975.)

The Dangers of Intrarectal Examination.—Dr. Robert F. Weir, whilst admitting the advantages that may be derived

from intrarectal examination, points out that Simon, who first drew attention to the proceeding, had indicated the possibility of danger and the point where it was likely to be encountered. Simon has measured many recta, and finds that the greatest expanding capacity of the intestine is at about two-and-a-half inches above the anus, where it can be stretched from nine to twelve inches. From this point to the superior extremity of the middle third, it gradually diminishes to seven or eight inches, and from thence rapidly lessens in circumference until, in the middle of the upper third of the rectum, it does not measure more than six or seven inches, the narrowest portion being at the beginning of the sigmoid flexure. He also learned that he could rupture the intestine in the dead subject by forcing his hand, measuring eight inches, into this portion. This point, at which the dangerous narrowing begins, is distant from the anus some four-and-a-half or five inches, and corresponds to the third sacral vertebra, and also to the reflections of the peritonæum which run forward from the rectum—in the male to the bladder, and in the female to the uterus; constituting the lateral boundaries of Douglas's cul de sac, and called by Simon the ligamentum semicirculare Douglasii. When the hand in its greatest circumference rests at this point, the tips of the fingers can be introduced into the sigmoid flexure, and with the mobility obtained from the extra calibre of the intestine, and from the mesorectum and mesocolon of the sigmoid flexure, palpation may be made in favourable cases as high as an inch or two above the umbilicus. The limit to the upward motion is the check action of the ligamentum Douglasii, and if too much force be used, this may be ruptured as well as the intestine, the vesical, middle hæmorrhoidal, and uterine arteries. By the slow introduction of the hand, using a rotatory motion and avoiding force, experience has shown that a bloodless examination may be made with a hand measuring ten inches in circumference. In exceptional cases only is it necessary to incise the posterior margin of the sphincter ani muscle. Nussbaum and Popp have both been able, by intrarectal explorations, to touch the ensiform cartilage. Dr. Weir proceeds to give a case of intestinal obstruction, with the usual symptoms caused by stricture of the colon, in which intrarectal exploration was resorted to when the patient was under chloroform. The hand of the operator, measuring nine inches in circumference, was passed slowly to the sigmoid flexure with the result that the intestine was found to be healthy. With the hand in this position, the lower border of the left kidney was easily recognised, the aorta a short distance above its bifurcation, and to the right the distended caput coli. The hand was then withdrawn, having been inserted to a depth of eleven inches by

measurement. The possibility of disease of the sigmoid flexure was excluded by the operation. During the rectal explorations, and probably in consequence of the subsequently discovered laceration of the intestine, the patient was much depressed, pulse feeble, and surface pale, but respirations regular. The colon on the right side was reached by Bryant's oblique incision; the lower edge of the kidney being seen. The gut was opened longitudinally, and about two quarts of fluid light-coloured fæces flowed out with relief to the somewhat tense abdomen. The intestine was stitched to the skin, and the remainder of the wound loosely stuffed with carbolised lint. The patient suffered much from shock, but rallied with stimulants for a time, and finally sank about twelve hours after the operation. At the autopsy, a stricture was found at the middle of the transverse colon, and a laceration of the front of the rectum running though the peritonial and muscular coats. (*Medical Record*, March 20, 1875.)

Ergotine hypodermically in Uterine Fibroids.—Hildebrandt, writing in the *Amer. Journ. Obstet.*, Feb. 1875, says:—"If we review all these circumstances, we are already enabled, after the comparatively small number of observations, to accept the following points as conclusively established on the prognosis of the treatment and cure of uterine fibroids by the hypodermic injection of ergotine. This treatment is most likely to be attended by favourable results:

1. When the tumour is richly provided with muscular tissue and possesses the consistence and feel of a tense, elastic cyst.
2. When the tumour is submucous.
3. When the walls of the uterus are sound, capable of vigorous contraction, not too much attenuated by dilatation or stiffened by exudation in their substance, and when there is no para- or perimetritis present.
4. As soon as the chronic metritis and parametritis, which frequently accompany fibroid tumours, have been removed by proper preparatory treatment, when the previously mentioned conditions again come into force.
5. When the tumour is unprovided with a capsule and merges directly without a boundary into the peculiar tissue of the uterus, which anatomical relation of uterine fibroids may be considered most favourable to their complete cure by absorption." (*Ibid.* p. 104.)

The Employment of Baths, etc., during the Menstrual Period.—The *Tribune Médicale*, No. 33, 1874, contains a report by Dr. Pradier on the above subject, followed by these conclusions:—

1. According to several authorities, some strong medicines,

such as emetics and purgatives, may be administered, or bleeding employed without inconvenience during menstruation. 2. Hydropathic treatment and sea baths have been given under the same circumstances for a long time without evil effects. 3. Several physicians do not hesitate to prescribe tepid baths in the same conditions. 4. As to mineral baths, one of our brethren has permitted them in like circumstances for seven years past, without having seen the least accident occur. (*Medical Record*, p. 112).

Chocolate in Chronic Intestinal Catarrh.—A series of articles from the pen of Dr. Karner have lately appeared in the *Allgemeine Wiener Med. Zeitung*, in which he shows the value of the substance as an article of food. In the last number of that journal he refers especially to its use in chronic intestinal catarrh and cites, among others, the following typical case of chronic catarrh of the intestines, to illustrate its action in the simplest manner: "Rosalia M., aged 17 months, poorly developed and nourished, suffered from intense meteorism, numerous thin, fluid feculent discharges, which alternated from time to time with normal stools. There was considerable emaciation, and the child also had intertrigo, of which there were frequent relapses. The diarrhœas could be attributed only to poor nourishment. After strictly regulating the diet, small doses of Dover's powder and acetate of lead were first administered, and in three days were substituted by the chocolate, of which a cupful was given daily. A dessert-spoonful of the powder sufficed for a cup of chocolate. The mother was also instructed to allow the child as little fluids to drink as possible. The result was astonishing. The discharges decreased in number day by day, the weight of the child rapidly increased, and after a few weeks it had perfectly recovered; a remarkable change for the better was observed in its bodily development, and the intertrigo had not recurred." (*Ibid.* p. 115.)

Bromide of Ammonium in Rheumatism.—Dr. J. M. Da Costa, Visiting Physician to the Pennsylvania Hospital, Philadelphia, while discussing rheumatism in a clinical discourse, says of this medicine, that the results he has obtained from it have been very satisfactory. He has now had the remedy on trial for more than a year, and has come to favour its use from the fact that it relieves the pain, acts generally upon the skin, keeps up the action of the kidneys, and, as he thinks, lessens materially the tendency to internal inflammations. He is further pleased with the remedy for the reason that the cases which he has treated with it have seemed to have a shorter duration than cases treated according to other plans, and quite as short as those treated according to the alkaline plan. The advantage which it possesses over the alkaline treatment is that

the recoveries are good recoveries; there is no pallor and anæmia, general distress, alteration of blood and tissues, which the long-continued administration of alkalies will cause. For these reasons he is in the habit of using the bromide of ammonium in the treatment of this class of cases. It is sometimes associated with acetate of potash, when internal complications render it desirable to have the influence of a somewhat more active diuretic. As soon as the acute symptoms have disappeared, the remedy is followed by the administration of quinine in fair doses, which has, he believes, the power to lessen the tendency to relapses. (*Medical Record*, p. 115.)

External Use of Turpentine in the Treatment of Tonsillitis.—In the *Leavenworth Medical Herald*, Dr. S. H. Roberts strongly recommends the use of turpentine externally in tonsillitis. He folds the flannel to four thicknesses, wrings it out in hot water, and pours oil of turpentine over a spot the size of a silver dollar. The flannel is then applied over the subparotid region, and the fomentation continued as long as it can be borne. After removal, a dry flannel is applied, and the same region rubbed with turpentine every two hours. This application is continued daily till resolution occurs. The doctor believes, from the evidence of his long experience, that thus applied early in the disease the oil of turpentine has almost a specific effect in tonsillitis. That its action is not simply that of an irritant he has proved by employing mustard, croton oil, tr. iodine, &c, in the same class of cases. They always failed to diminish the inflammation of tonsils, while the turpentine succeeded. (*Ibid.* p. 117.)

Nitrite of Amyl in Cardialgia and Tetanus, &c.—Funkel (*Deutsches Arch. f. Klin. Med.*) recommends the use of this remedy in cardialgia. After a few inhalations the pain disappears, and if it return, as in a few instances it does, they are to be renewed. The neuralgias accompanying menstruation have also yielded to its influence. One case of tetanus, which had resisted the action of all the means hitherto applied, yielded promptly to the inhalation of two drops three times a day. (*Berlin Klin. Woch.*, Jan. 4, 1875; *New Remedies*, p. 119.)

Subcutaneous Injection of Carbolic Acid in Traumatic Erysipelas.—Dr. Hirschberg relates the case of a slaughterman who accidentally cut his upper arm, the wound being about five inches long, and penetrating the muscles. A good deal of venous hæmorrhage followed. On the second day a bad attack of erysipelas of the arm came on. A two per cent. solution of carbolic acid was injected subcutaneously at the upper boundary of the erysipelas, and next day all traces of erysipelas had

disappeared. The injections were repeated five times within the next three days, and the wound healed far more rapidly and with much less suppuration than could have been expected. (*Berlin Klin. Woch; New Remedies*, p. 121.)

Sulphuric Acid in the Treatment of Boils.—Dr. Madison Marsh, of Port Hudson, La., says, in the *Medical and Surgical Reporter*, that boils and other analogous affections are treated by him with sulphuric acid, which he regards as almost a specific. He has used the acid with constant success for five-and-twenty years. "As soon as the patient applies for relief," he says, "I put an adult on elixir vitriol, 20 drops three times a day, in a glass of sweetened water, one hour before meals, previously smearing the teeth well with fresh butter or chewing a piece of fat pork, for a sure protection to the teeth. This is much better than sucking through a quill, as there is in this way regurgitation enough to throw the acid forward on to the teeth. Using the butter or pork is a perfect protection, if the teeth are subsequently washed with a solution of bicarb. soda, a heaped tea-spoonful to a glass of water. In the use of sulphuric acid in this way, the boil (or crop) then on hand will soon melt away, and there will be but one effort more to return before they will finally disappear, no more to reappear. The acid should be kept up in ten-drop doses for at least two weeks after the boils have disappeared. To assist in their local treatment, to effect a speedy cure and afford relief from pain and soreness, I apply a piece of common adhesive plaster, cut round, sufficiently large to cover the tumour to the extent of the areola, clipping the edges so that it will set smooth; or a little shoemaker's wax spread on a cloth will do just as well. I have made this application to saddle boils, and next day rode in the saddle very comfortably, the boil progressing to maturity with very little pain, and sometimes effecting an abortion at once. In this connection I have read in your *Periscope* a very interesting and scientific article on the sulphides of soda, potash and calcium, as an antidote for all these ills of humanity. And now, here let me suggest, perhaps the chemical play of affinities in nature's chemical laboratory may evolve the sulphides in the same way that chloral amateurs claim that hydrate chloral is metamorphosed in the blood to chloroform." (*New Remedies*, p. 134.)

The active principle of Senna.—New proofs have been furnished of the easy alterability of the active principle of senna, in several papers recently presented to the University of Dorpat. The results of numerous and repeated experiments upon infusion of senna show conclusively that when an infusion of senna is evaporated in the air to the consistence of an extract, the product loses much of its therapeutic activity. If the

extract so obtained be dissolved in a large quantity of water, and evaporated a second time, the extract obtained is inert. The results, though contrary to those obtained by Heerlein (*Pharm. Cent. Blatt.*, 1851,) and noticed in the *U.S. Dispensatory*, p. 772, seem to be abundantly proved. The following results were obtained from the experiments made, and which are noticed in a recent number of the *Journal de Chimie et de Pharmacie*. Alkalies rapidly alter the purgative principle of senna at the temperature of ebullition. An infusion of senna in lime-water raised to a boiling temperature, and the lime subsequently removed by carbonic acid, gave a liquid which was quite inert. An infusion of senna, to which caustic potassa had been added, and raised to a temperature of 212°, was, after neutralisation by an acid, likewise inert. Mineral acids act with scarcely less energy. Vegetable acids exert only a feeble action. The results of numerous experiments also show that the purgative principle of senna is insoluble in concentrated alcohol, for the alcoholic extract obtained was without purgative action. Cold water dissolves this principle very rapidly. Senna treated by concentrated alcohol loses its taste and odour, but preserves its activity. The use of senna previously exhausted by alcohol should become general; for the infusion prepared after exhaustion, being free from disagreeable taste, can be easily administered even to children, who take it, according to the above authority, without the slightest repugnance.

Compound Tincture of Benzoin in Chronic Dysentery.—Mr. Donaldson observes that the use of this remedy having again been revived by Surgeon W. J. Charlton, is beginning to be frequently used in Burmah. The combination usually prescribed by Dr. Charlton is—

℞.	Tinct. Benzoini Co.	ʒi
	,, Catechu Co. .	ʒj
	,, Opii . . .	m x
	Ext. Hæmatoxyli .	gr. x
	Aquæ	℥ j

Ft. haust. To be given three times a day. It occasionally happens, particularly in those cases where ipecacuanha has been unnecessarily persisted in, that the stomach becomes intolerant of the medicine. In such a contingency it may be administered by the rectum with equally good effects, from one to four drachms being employed in combination with mucilage, tincture of opium, &c. for each enema. (*Indian Med. Gaz.*, June 1, p. 167.)

Villate's Mixture in Caries.—In a paper in the *New Orleans Medical and Surgical Journal*, Dr. Hopkins mentions that this

mixture was originally employed for caries in the horse: and was afterwards used by Notta and Nelaton.

The original formula of this solution, as first composed by Villate, is as follows:—

℞. Liquoris Plumbi Subacetatis . . . . . ℥ij
Zinci Sulphatis Crystal. and Cupri Sulph. Crystal. āā ℥ss
Aceti Vini Albi . . . . . ʒʒij ss mix

Dissolve the salts in the vinegar, and add the subacetate of lead. Shake before using.

It is very important that this preparation is made as stated. Druggists very often substitute for the white-wine vinegar a solution of pyroligneous acid, in which case the liquid acts as a powerful caustic, and the patient cannot bear its application.

These two solutions can be very easily distinguished at first sight. When the pyroligneous acid is used, the solution, once settled, has a bluish hue: but when prepared with the white-wine vinegar it has a greenish hue. This is a capital point, for surgeons have noticed a great difference in using both preparations on the same patient. The pyroligneous acid solution has produced excessive pains and serious symptoms of irritation and inflammation.

The mixture of Villate, when first injected into a fistula, or applied to a wound, produces a sharp pain, which may last an hour or more; but the patient soon becomes accustomed to it, and in a few days bears it without complaining. To avoid violent pains in nervous or irritable patients, it should be at first diluted with water, and the dilution gradually made stronger until they can bear it pure.

The first injections determine inflammation in the parts coming in contact with the solution. Those inflammatory symptoms are generally limited.

Suppuration is more abundant, but will soon diminish, and stop entirely, which indicates a rapid process of cicatrisation.

In caries, flakes of bone will very often be washed out by the injections, or thrown out with the suppuration, but after their elimination the cure will soon follow.

The mixture of Villate could not be used like tincture of iodine in the treatment of cysts or circumscribed collections; in other words, in cavities not communicating with the exterior, into which more or less tincture of iodine can be safely injected. It is necessary that it should run out easily; it should, therefore, be employed only in the treatment of those cavities communicating with the exterior by means of fistulæ. (*Cincinnati Med. News*, May, 1875.)

Injections of Tincture of Iodine into the cavity of the Uterus.—In a paper on this subject Dr. Trask seeks to show:—

1. That a very considerable portion of cases in which the injection of salts of iron has apparently saved life, have been those in which it accomplished this end, not in virtue of its local styptic action, but because of its power to excite reflex action when cold, friction, pressure, &c., have failed.

2. That when it produces coagulation of blood in the orifices of the blood-vessels there is danger that the coagulation may follow the vessels into the substance of the uterus, producing dangerous thrombi, and that the blood already collected in the cavity of the uterus also may become converted into a hard, intractable coagulum which the uterus cannot expel, and which may, after a few days, decompose and give rise to septicæmia.

3. That there is evidence for believing that as an excitor of dormant reflex action, tincture of iodine may be substituted for the iron with positive advantage, from its efficiency as an excitor and from its antiseptic properties.

If these points are established, the use of iron salts in a solution sufficiently strong to induce coagulation of blood in the uterine vessels should, at any rate, not be resorted to until tincture of iodine has been tried and failed. (*Journal of Obstetrics*, February, 1875.)

Pythogenic Pneumonia.—Dr. Grimshaw remarks that hospital physicians have long observed that, contrary to *à priori* considerations, pneumonia—a disease which might naturally be regarded as peculiar to winter—discovers a tendency to prevail even in the warm season of the year. The weekly reports of the Registrars-General also bear striking testimony to the occurrence of a comparatively high mortality from pneumonia in early summer and autumn. In a table compiled from the Registrar-General of Ireland's Reports for nine years, Dr. Grimshaw finds that of every 100 deaths from *bronchitis*, 44 occurred in the first quarter of the year, 22 in the second, only 10 in the third, and 24 in the fourth; whilst in 100 deaths from *pneumonia*, 32 occurred in the first, 27 in the second, 16 in the third, and 25 in the fourth quarter. Dr. Grimshaw then gives a series of cases to show the clinical aspects of the peculiar form of pneumonia, which he terms pythogenic pneumonia. The disease does not follow the regular stages of pneumonic inflammation. In many cases it seems to be arrested in its first or congestive stage, but also often proves fatal. It has a close relationship to enteric fever, as shown by the characteristic appearance of the tongue, rose-spots on the skin, pain on pressure made upon the abdomen. The invasion of the disease is sudden, the patient getting a rigor without having experienced any previous malaise; this is generally succeeded on the following day by pain in the side and shortness of breath. The pain is often

absent. The patient usually first comes under the notice of the physician between the third and sixth day of the disease, at which period he will generally be found to have a portion of his lung consolidated; his pulse from 120 to 140, extremely soft, and compressible. There is great debility and thirst, a constant short, teasing cough, with little or no expectoration. The physical signs during this period are those of ordinary pneumonia in its first stage. It may now suddenly subside, or it may follow the course of ordinary pneumonia: in the latter case, a tendency to relapse being observable. The disease is not usually very fatal, and there is not so much disposition to attack the lower lobe of the right lung as in ordinary pneumonia. In regard to the treatment, this was in many cases of a purely expectant character; but this, Dr. Grimshaw thinks, is not an advisable course. The drug which singly he has found of most value is quinine, given in considerable doses, as five grains every three hours, with a little nitrate of potash and dilute nitric acid. In cases where there was much depression, alcoholic stimulants or turpentine have been employed with manifest benefit. To relieve pain in the affected part, poultices have been successfully employed, and when counter-irritation was considered necessary, sinapisms preceded the use of the linseed cataplasms. In case of intense pain in the affected side, from two to four leeches usually gave relief. On no occasion were blisters employed during the acute stages of the disease. (*Dublin Medical Journal*, May, 1875.)

A Typhoid Epidemic, apparently arising from Infected Milk.—Dr. Ogston, of Aberdeen, records the case of a girl of 17, who suffered from typhoid fever, which was by exclusion referable only to infected milk. On examination, it was found that the water of the dairy came from two sources—a spring-well, pure and unimpeachable, and a roadside spout which came from a spring a mile further up country, but receiving no sewer above this. It was also fed by the drains of the surrounding arable land, and, after passing a place called Whitemyres, received, half a mile further down stream, a half-choked drain from a house (and ground soaked with sewage) where no illness existed. What it received from the drain was very insignificant in quantity. This water was used in the dairy for scullery purposes only; but it was conceivable that some of it might have entered the milk-vessels. About a week after the girl had died an epidemic of typhoid fever broke out in some of the healthiest and best quarters of Aberdeen; and it was soon discovered that the disease was almost without exception limited to the families supplied with the milk from this dairy, and that of all those so

supplied a very large proportion had the disease. (*Glasgow Med. Journal*, July, 1875.)

Keeping the Bed after Confinement.—Dr. Goodell, of Philadelphia, in his account of the treatment of lying-in women in the Preston Retreat, writes as follows in regard to the common practice of keeping the bed:—Lying-in women are encouraged to get up for good when they feel so disposed, because there are to my mind strong objections to the rigorous maintenance of the recumbent position. Labour is in general a strictly physiological process, and there can be no sound reason why it should be made to wear the livery of disease. Nature teaches this very plainly, for most women wish to get up long before their physicians are willing to let them. The fact of a woman wishing to get up is to me a very good reason why she should get up. In the second place, few physicians will deny that nothing so relaxes the tone of muscular fibre as a close confinement in bed. In my experience a woman ordinarily feels stronger on the fifth day than she does on the ninth if rigorously kept under quilts and blankets. Once more: the upright position not only excites the womb to contract, but, by distributing the blood and equalising the circulation, it actually lessens the amount of the lochia, and shortens their duration. On the other hand, the dorsal decubitus keeps up a passive congestion of the womb as a whole, the engorgement of the greatly hypertrophied placental site, and a blood stasis in the now thickened posterior wall, all important factors in hindering the process of involution. Again: uterine diseases are hardly known among those nations whose women early leave their beds. From passages in the writings of the classics, it is evident that amongst the ancient Greeks and Romans—those models of physical grace and beauty—the women arose and even bathed in a running stream shortly after delivery, in some cases on the very day. Finally, what is sounder than all theory, a sufficiently long and well-sifted experience has proved to me that by such a treatment convalescence is rendered far more prompt and sure. At this result, very unexpected to the multifarious patients of the Retreat, they are constantly expressing their surprise. (*Cincinnati Medical News*, March, 1875.)

Oxygen as an Antidote in Poisoning with Phosphorus.—MM. Thiernesse and Casse have made some experiments on this point arising from a discussion in the Belgian Academy, in which it was maintained that whilst the raw oil was effective the rectified oil was inoperative. The authors first endeavoured to determine the advantages of transfusion of defibrinated and arterialized blood, both before and after venesection had been practised on the poisoned animal; the results proved unsatis-

factory. The effects of the direct injection of oxygen gas, slowly performed, were on the contrary very good, providing it was done before any deep-seated alteration in the structure or composition of the body had been effected by the poison. If the gas was allowed to enter the veins gradually, no ill results follow. They found that 150 to 200 ccm. of oxygen were required for a dog weighing 12 to 18 lbs. avoirdupois, and from 300 to 500 for dogs weighing considerably more. They give a description of a simple apparatus they have employed for the production and injection of oxygen. (*Bull. de l'Acad. Roy. de Med. de Belg.*, t. ix. No. 1.)

The Administration of Ergot in Excessive Secretion of Milk and Inflammation of the Mammary Glands.—Herr Schtscherbinenkoff in a Raphanus epidemic in the department of Simbirski, in Russia, observed that amongst the symptoms of ergot poisoning a diminution or complete arrest of the secretion of milk was not unfrequent. He noticed also that this occurred in cows fed in part with the diseased grain or with badly thrashed-out straw, in which many of the grains remained. But since an accumulation of milk in the milk ducts is the essential cause of mastitis parenchymatosa, it occurred to him that it might be serviceable in preventing the production of the excess of milk. In two cases of multipara who, after each previous confinement, had suffered from mastitis suppurativa, Schtscherbinenkoff used ergot with the best results, giving it as soon as the swelling of the breasts from the increased secretion took place. In cases of milk fever, also, he gave, coincidently with the ergot, quinine, and in equal doses—about five to ten grains three times daily. He likewise administered it with excellent results during the period of weaning to suppress the secretion of milk. He gave as much as one drachm of ergot daily for a week without any unpleasant consequences. (*Centralblatt f. d. Chirurgie*, No. 19, 1875.)

The Treatment of Epithetial Tumours of the Neck of the Uterus by the Galvano-caustic Wire.—M. Labbé sums up the advantages of this method of treatment in the following propositions:—1. The removal of the tumour is so rapidly effected, the time not exceeding thirty to forty seconds, that chloroform is unnecessary. 2. Besides the rapidity with which the ablation is accomplished, the cut surface is so smooth and free from bleeding that there is little chance of secondary hæmorrhage. 3. The platinum wire is so supple that it can be applied without any effort being made to drag down the uterus. 4. The mode of application of the wire requires no instruction. It is important, however, that when it has been made to glow by the passage of the current that it should be pressed well into the new growth to avoid injuring the healthy parts, and this he

effects by a special apparatus with screw. As soon as the removal is effected a cold vaginal injection follows, and as a matter of precaution it is well to place a pledget of lint dipped in perchloride of iron on the wound. (*Annales de Gynæcologie*, 1874.)

Uræmic Convulsions treated by Morphia.—Dr. Potter gives the case of a patient, æt. 62, who had been suffering for a year from Bright's disease. On the last day of January, 1874, he was seized with uræmic convulsions, each fit lasting from five to ten minutes, with from ten to twenty minutes of consciousness intervening. The consciousness during the intervals gradually decreased, until he lay between the attacks in a deep stupor, breathing stertorously. As all means tried for relief proved unavailing, and as the patient was sinking rapidly, twelve minims of Majendie's solution of morphia were injected into the cellular tissue of the fore-arm in the midst of a convulsion. No convulsion occurred during the four following hours. He then had two slight attacks, after which there was no return. In ten days he had so far recovered as to be dressed; he had partial paralysis of the right side and hemiopia, the left half of each retina being impaired. During the past year he has had no return of convulsions: he complains of muscular weakness of the right upper extremity with sensation of numbness of the right half of the body. The hemiopia has but slightly improved. The result in this case goes far to show that the danger to be apprehended from the use of morphia in uræmic convulsions has been exaggerated. The effects of opium upon the cerebral circulation in all probability differ widely from those which are caused by the non-elimination of the effete matter which in Bright's disease gave rise to uræmic convulsions. (*Boston Med. and Surg. Journ.*, May 27, 1875.)

Treatment of Hæmorrhoids by Injection of Ergot.—Dr. G. W. Semple reports five cases of piles, two of which were accompanied by prolapsus of the rectum, which he treated successfully by injecting into the rectum after every fæcal discharge half a drachm of the fluid extract of ergot with half an ounce of water. One had a greatly enlarged spleen, which was reduced to its normal size by the treatment. A third was that of a pregnant woman who suffered no inconvenience from the treatment. (*St. Louis Med. and Surg. Journal*, April, 1875.)

Operation under Chloral Hydrate.—Dr. J. and A. Nairne record the case of a delicate-looking female child, three years of age, which was put under the influence of chloral, and had the third metatarsal bone of her left foot removed for disease. An aqueous solution of chloral was prepared, of which

20 minims contained 12 grains, and they had also at hand a solution of strychnia of 2 grains to the ounce. At 10.30 10 minims were injected subcutaneously into the right lower leg; the child cried continuously for some minutes. At 10.40 10 minims more were injected, and the child given to its mother to carry about. 10.45 drowsy, but easily roused; starts and cries suddenly, and as suddenly ceases. 10.55, 10 minims more injected into the left lower leg; sleeps quite soundly; no flushing of face; wakes in a moment, and is asleep again in a moment. 11.5, 10 minims administered by the mouth; begins to snore; pinching makes her cry, but she sleeps immediately. 11.15, 10 minims more administered by the mouth. 11.20, seems now in a deep sleep; pinching does not awake her. The operation was now performed. During its performance she began to cry, but made no struggling. The eyes remained nearly shut, and the crying seemed like that of a dreaming child. She ceased crying immediately the operation was done, and was fast asleep in a moment. She was allowed to sleep for two hours. Strong tea was then prepared, of which she was made to drink a cupful, and in another three quarters of an hour she sat up, dazed-looking, but quite unterrified, and apparently oblivious of any pain. The solution of chloral was too concentrated, and made deep wounds afterwards, which, however, healed up well enough. (*Glasgow Med. Journal*, July 1875.)

The Physiological Action of the Preparations of Bromine.—Dr. Steinauer observes that the value of the bromides is attributed by some therapeutists, as Schouten and Binz, to the alkali, whilst others consider it to be due to the bromine. In order to settle this point he made a series of experiments with different preparations of bromine, in some of which the preparation used consisted of a stable compound of bromine, and was eliminated by the urine in an unchanged condition, whilst in others the compound was instable, and was decomposed in the system, so that the bromine was discharged in the free state. The results of his experiments were as follows:—1. The bromine compound exhibits an energetic action only in those chemical compounds in which there is a possibility of the bromine atom being detached. Experiments with hydrobromic acid and monobromated acetic acid, made both upon cold-blooded and warm-blooded animals, gave constantly the same results—namely, that in doses in which the acetic acid of the compound subcutaneously injected in an equal state of dilution produced no effect at all (as in frogs in 0·005—0·3 grm. doses and in rabbits in doses varying from 0·05—1); the monobromated acetic acid rapidly produced a lowering effect upon the pulse and respiration, until the heart was completely arrested.

Researches made with the aid of artificial respiration showed that the action on the heart was the primary one. Other researches, in which after section of the vagi and after paralysis of its intra-cardiac terminal nerve fibres with nicotin, after which the action of the bromine was still apparent, showed that the action of the bromine was essentially upon the heart itself. Lastly, researches in which the experiments known as Stannius' and Munks' failed showed clearly that the action of the bromine was to paralyse both the cardiac muscle and the excito-motor cardiac nerve centre. Steinauer further observed that the bromo-acetic acid effected a diminution in the excitability of the ganglia of the spinal cord, as well as of the peripheric nervo-muscular apparatus. After the administration of the poison the animal lost its sensibility for tactile (contact and pinching) and chemical (brushing with acid) stimuli, and the same occurred after elimination of the influence of the will upon movement by division of the cord between the occiput and first vertebra, no reaction being obtainable at a period when in other animals not under the toxic influence of the drug mechanical and electrical excitation of the nerves still caused active contraction. The reflex paralysing influence of the bromine was not referable either to the affection of the motor nerves nor to the enervated muscles, but to its action upon the spinal centres.

In regard to those preparations of bromine which were so stable that the bromine would not separate, as in monobrom-benzol and sodium bromo-benzoate, no free bromine appeared in the urine; it was found in these cases that the substituted atom of bromine caused an alteration of the nutritive processes and the action of other compounds. (*Virchow's Archiv.* lix. p. 65, and *der Prakt. Arzt.* No. 2, 1875.)

Results of Non-mercurial Treatment of Syphilis.—Under the heading of Clinical Contributions to Syphilidology, Drs. v. Buren and Keyes report two cases to the Archives of Dermitology for 1875. The first was that of a physician, who while a student got a small primary insignificant sore. He took no medicine; a slight papular rash appeared. For this he physicked himself with laxative medicine, but took no mercury. The rash disappeared, and was not followed by a successor. His health remained perfect. Nine years after the chancre a node appeared upon the cranium. This caused no uneasiness, its nature not being suspected. The node remained hard, solid, untreated for eleven years, the general health continuing vigorous; but now the patient became prostrated for several weeks by an illness which had no connection with syphilis, and on recovery from the attack the node softened. After being

opened the edges sloughed extensively, leaving the bone bare over a circular area of more than two inches in diameter. At the time of the patient's visit the necrosis had been visible for nearly a year; its nature had been suspected, but he had employed no specific treatment. Pus had burrowed under the scalp for several inches posteriorly. In a second case, the man remembered only that he had had a slight urethral discharge, which was, however, in all probability a urethral chancre. It was followed by double epididymitis. Twelve years afterwards some ecthymatous spots appeared upon his legs, which disappeared under the use of arsenic, leaving pigmented scars. A year after his general health failed; he had hemicrania and double vision, loss of memory, and evidences of failing brain power. He was sent to Europe, and after some months tertiary symptoms developed in the form of gummatous inflammation of the soft palate. Improvement commenced at once, and advanced with great rapidity under iodide of potassium. Both of these are cases which were mild, and should, according to Diday, not have been treated with mercury. The authors draw the following conclusions;—1. The evolution of syphilis may be mild and regular even when no mercury is used in the treatment. 2. With the mildest treatment at the beginning, syphilis, if untreated, may terminate in the most terrible consequences after years of quiescence, 3. The severity of tertiary lesion does not depend upon the previous use of mercury. 4. The efficacy of iodide of potassium, properly employed, does not depend upon a previous use of mercury. 5. The history of one of the cases shows that a father with syphilis may have a perfectly healthy child. In a paper on the use of iodide of potassium in syphilis, contributed to the *Philadelphia Medical Times*, March 13, 1875, Dr. Joseph R. Beck states that he has not made use of mercurials in syphilis for a very long time. Notwithstanding that secondary symptoms rapidly disappear when mercury is employed, he maintains that we have only succeeded in masking the disease, and that after a time tertiary symptoms *are seen* to make their appearance. Syphilis, whether secondary or tertiary, cannot be radically cured in a few weeks or months, but requires a year or more of careful treatment. For the cure of syphilis by iodide of potassium, very large doses must be employed. He prescribes seven drachms of the iodide and four drachms of the ammonio-citrate of iron in an eight-ounce mixture, and gives a tablespoonful before each meal. Fowler's solution of arsenic (one drachm three times a day of an eight-ounce mixture, containing three drachms of the solution) is also prescribed; and if anæmia be present, one grain of quinine and two of pulvis ferri are given every three hours; also cod-liver oil, with fluid extract of valerian. The quantity of iodide and of Fowler's secretion are

very gradually augmented till symptoms of iodism are induced. Its administration is then stopped for a week, and then resumed for a week; if iodism shortly again recurs, the patient is dismissed, as Dr. Beck believes, permanently and radically cured. (*Boston Med. Journ.*, May 27, 1875.)

Treatment of Vaginism.—M. Bouchut observes that the spasm of the vaginal sphincter in this affection is often due to the same cause as the spasm of the anal sphincter—a very small painful longitudinal fissure being detectable at the lower part of the orifice of the vagina. Forced dilatation would seem to be indicated here as in the fissure of the anus; but in M. Bouchut's opinion, before having recourse in either disease to so painful a procedure, we should try simple measures, which will often prove efficacious. To this end he strongly recommends vaginal suppositories formed of five parts of cacao butter and three parts of extract of rhatany, thoroughly well incorporated. One of these is to be introduced into the vagina night and morning and allowed to dissolve there. The patient should also employ a bran bath for an hour daily. (*Gaz. des Hôpitaux*, May 1.)

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Department of Public Health.

THE HYGIENIC MANAGEMENT OF HOSPITALS.[1]

If an opinion may be formed from incidental revelations in the medical journals, and from the current gossip of the profession, it would appear to be a question whether, in regard to hospital diseases, such as erysipelas, diffuse cellulitis, pyæmia, &c., our newest hospitals present any appreciable advantages over our oldest. It is true that our oldest hospitals have been, as a rule, so amended in their internal arrangements and general management, that the prevalence in them of hospital diseases, which twenty-five years ago so often aggravated the condition of the patients in the wards, has been reduced very largely. But on the other hand, it is seemingly not less true that our newest hospitals, designed with special reference to the prevention of these diseases, differ little in this respect from the older hospitals as at present managed. This curious anomaly has served to point some arguments against hospitals altogether, at least for the treatment of surgical cases, unless indeed the hospital in size and structural arrangements be made to approximate to a private house or cottage. Conversely, an explanation has been sought in defects of design, and infinite skill has been brought to bear upon the questions of the dimensions and arrangements of wards, and their general regulation. But in the newer hospitals, whether constructed according to the earlier or the latest conceptions, hospital diseases make their appearance as in the older hospitals, to the vexation and disappointment of the

[1] English Hospitals in their Sanitary Aspects. The Annual Oration delivered before the Medical Society of London. By George Buchanan, M.D.

Report on Recent Prevalence of Erysipelas in the Radcliffe Infirmary, Oxford. By J. Netten Radcliffe.

medical staff and the apparent discredit of approved principles of hospital construction and management.

Latterly, this question has been treated so much with reference to the structural requirements of hospitals, that other and not less important considerations have been neglected. This subject has recently received the independent attention of two practised sanitary inquirers—one with reference to the general question, the other with reference to an outbreak of erysipelas in the wards of a provincial hospital, and the opinions which they have expressed deserve attentive consideration. The one observer entertains a very decided opinion that the frequent occurrence of hospital diseases, in both old and new hospitals, now chiefly arises from certain defective principles of sanitary management common to both, and which frustrate the results sought to be obtained by amended arrangements and general management, in the one case, and by the best considered structural design in the other. The other observer undesignedly illustrates this opinion in the completest way from a particular instance. The observers in question were Dr. Buchanan and Mr. Netten Radcliffe. The former, as this year's Orator before the Medical Society of London, took this question, and the question of hospitals in relation to public health administration, as the subjects of his oration. The latter has lately been reporting upon the prevalence of erysipelas in the Radcliffe Infirmary, Oxford.

Dr. Buchanan states his position thus:—

"The proposition that a hospital has a duty to promote the recovery of its patients by all possible hygienic measures, as well as by the ministrations of the surgeon and physician, has, at least since the times of which I have spoken, commanded a certain vague assent. But down to our own days practice has been sadly behind principle in this regard: and abundant cases may be adduced of mischief done by hospitals, in civil and in military practice, for the mere want of that incessant solicitude as to sanitary conditions which would be considered inexcusable if it related to therapeutical conditions."

While, in fact, it has been recognised that sanitary medicine is, as Dr. Buchanan phrases it, "the equal and ally of curative medicine," this principle has to the present time been very imperfectly applied to the treatment of the sick in hospitals. Even with regard to those general sanitary conditions to which since the Crimean war so much attention has been given, there

is still much to be desired, while in regard to the hygienic relations of particular diseases and certain classes of cases, almost everything systematic has yet to be done. Of the former conditions, Dr. Buchanan observes :—

"I will say nothing of original design or construction—a matter on which those who are to have the management of the sick may or may not have been consulted—but it would be interesting to know, with reference to the every-day management of these institutions, in how many of them is such a thing as a plan of the drainage to be seen? or, in how many are water-cisterns periodically cleaned out? in how many is there some one responsible for current cleanliness, for the efficiency of water-closets? in how many could the state of the ward-air at early morning be vouched for? Admittedly these common things affect what it is the province of the hospital by all means to care for—the health of the hospital inmates; but too often, I fear, it happens that such matters are treated as the chance concern of anybody out of a dozen officers and servants. It is only when some hospital disease makes its appearance that these every-day sanitary matters are thoroughly looked into, and the records of hospitals abound with stories of how they have been neglected. In one place, a dust-bin provides matter for some interesting ætiological speculation in connection with prevalent erysipelas; in another, faults of closets and sinks disturb some deductions about the way of spread of fever; in a third, wards are over a dissecting-room; in others, imperfect drainage is found, and so on and so on. And for each such instance of sanitary neglect in connection with some palpable calamity, how many instances must there be where similar neglect goes undetected, doing its mischievous work not less surely because slowly, while its results are ascribed perhaps to the 'temperaments' of individuals, or to the 'epidemic constitution' of the time!"

Again, as to the hygienic relations of the sick in the wards, he says:—

"It is not, however, till we go on to consider the hospital as a place specially devoted to sick and maimed people that we can begin to appreciate the full meaning of 'sanitary circumstances' there, or that we can attempt to realise the need that at every moment exists for a skilled sanitary care.

"Now we have to do with people giving off from their bodies not particles of waste merely, but diseased particles that have potency for harm to the body that generated them and to other bodies; and now we see a wholly new significance attaching to those common sanitary demands of cleanliness and dryness. Now we have to do with bowel secretions capable of specifically poisoning the entire sick community, and now we see a quite fresh importance attaching to the common demand for good drainage and for complete excrement removal. Now we are concerned with people wanting in healthy power of resistance to evil influences; themselves, let me repeat, helpless, and their very helplessness clamouring for protection at the hands of their guardians. Under these circumstances, surely the completest solicitude is given to ensure security against all preventible mischief. Surely it is impossible that a patient with consumption should have a case of typhus put in the next bed to him, or a compound fracture be brought into the neighbourhood of a case of erysipelas. It must be impossible that a disease so preventible as enteric fever should ever appear among hospital inmates; there can never be question of carelessness about dressings, of hands foul from the post-

mortem room. Rather the environments of each person are studied with reference to even the remoter chances of injury to him, and considerations of convenience are set aside when there can be question of even small advantage to the patient. With the curative side of hospital treatment we know that this is so: surely it is so also with sanitary care."

Alas! We know how different is the reality—a difference not, as a rule, arising from any failure to recognize the importance of the various matters, but from a failure to recognise the conditions under which the needful requirements can alone be carried out. What the cardinal condition is, Dr. Buchanan thus describes:—

"What I am sure of, however—and it is this point that I venture to insist on strongly—is, that there are few hospitals in the kingdom of which it can be affirmed that the sanitary arrangements required to fit the institution for the care of a number of sick are thoroughly known to a competent and responsible officer whose business it is to keep the governing body informed of the facts. Just as there should be some one charged with the duty of seeing to common drainage and ventilation, so there should be somebody to answer for the more special sanitary arrangements of the place; whose business it should be to make sure, for instance, that stools possibly infective are disinfected before they are discharged into drains, that foul dressings are duly burnt, that patients on their admission are put in the particular wards, and placed under the particular circumstances that shall suit them best; who should be responsible for preventing accumulation of suppurating wounds in a ward, and for separating, with all proper precautions, any case that threatens to be erysipelas. Surely all these things should be somebody's business. They cannot well be the affair of non-resident physicians and surgeons; they ought not to be the affair of student officers; still less ought they to be considered as merely the concern of a steward or matron, or perhaps of a nurse or a servant. Efficient observation and record of the day-to-day sanitary circumstances of the various parts of a hospital, such as I contend it is the duty of every governing body to ensure, demands a thorough knowledge of hygiene and pathology, and some experience in the practical application of those sciences. The officer specially charged with these functions, again, should be a person to command the confidence of the medical officers, with whose province his own would be ever in contact. And he should be capable of enlisting students and others as fellow-workers with himself, and of adding from his special experience to the general store of hygienic knowledge.

"I trust the time is not far distant when an officer specially charged to look after the sanitary welfare of the institution will be found at every hospital in England. The duty is one that essentially pertains to a medical officer, and far preferably to a resident officer. Vaguely, no doubt, some such duty is now expected from most of those who, under the title of 'house-surgeon,' 'resident medical officer,' or 'medical superintendent,' are entrusted with the general professional headship of the establishment; but this duty of sanitary superintendence is at best regarded as an incidental or second-rate matter, and neither the responsibility nor the authority needful to its efficient discharge is definitely imposed upon this officer, or on any one else by the governing body of the hospital. Obviously in regard of duty of this sort vagueness is the very thing to be avoided, and

the present want of system must, as soon as the importance of hospital sanitary regulation is appreciated, give place to definite responsibility imposed on one person having the style and functions of a sanitary medical officer."

Now let us see how Mr. Netten Radcliffe's inquiry helps us to apprehend more clearly (if this be needed) the importance of Dr. Buchanan's opinions on the subject under consideration.

The Radcliffe Infirmary, Oxford, is partly an old building, partly a new building. The new building, so far as we have concern with it here, consists of a noble Accident Ward, on which the highest skill has been exhausted in construction and arrangement. The old building has been so amended, that its ward offices are models of excellent arrangement and construction, and the wards themselves are, for the most part, unobjectionable as to capacity and ventilation. Last year there was a serious outbreak of erysipelas in the wards almost wholly confined to the surgical cases, and of traumatic origin. Erysipelas appears to have shown itself in the city about the same time that it manifested itself in the hospital; but the disease in the hospital seems to have been produced therein. None of the wards occupied by surgical patients escaped, and the Accident Ward especially suffered. The conditions under which this outbreak occurred were partly peculiar to the wards, and partly peculiar to the Infirmary and city. The extension of the disease within the wards was "largely the result of propagation by contagion." Of the conditions peculiar to the wards, the most interesting perhaps relate to the Accident Ward. While on the one hand this ward had been built to represent the most advanced knowledge of hospital-ward construction, on the other, the ward was exposed to conditions which would largely diminish the advantages from the construction. All the ashes and ash-bin refuse of the hospital were screened beneath the windows; the laundry was also close to its windows, charging the atmosphere of the ward with undue and usually foul moisture; the air for warming it was the foulest the precincts of the hospital could supply; and the drainage was imperfect. As to the conditions common to the infirmary and city, the hospital main drain opened into an old sewer of the city system, which at comparatively frequent intervals became blocked up (unknown to the infirmary authorities), and was

for months an elongated cesspool, with no means of ventilation except through the soil-pipes of the ward water-closets in the vicinity of the wards. Then as to ward management, there was no due proportion kept in the number of serious accidents put into a given ward; there was no systematic isolation of the cases of erysipelas as they occurred in the wards even after the spread of the disease by contagion commenced, while the maintenance of a systematic rotation of service, by which every nurse in the hospital in turn undertook duty at frequent intervals in the Accident Ward, ensured a dispersion of contagion throughout the building. In fact, as Mr. Radcliffe points out, the rules of precaution which we are accustomed to insist upon in the case of contagious diseases in a private house were ignored in the wards of the Infirmary.

But, as Mr. Radcliffe shows, all these shortcomings arose not from any indifference of the governing body or the medical staff, but from the fact that everybody was responsible, and nobody was responsible. Indeed, after the too common practice of hospitals, there was no means of knowing at any given moment the actual status in the hospital of cases liable to traumatic infection, and of cases of traumatic infection, no systematic regulations for preventing their occurrence, or for effectually checking them if they did occur, and finally no systematic supervision of the many things summed up under the common designation sanitary condition of the hospital. Nor in the absence of any person or persons definitely responsible for and skilled in such supervision, was it likely that a different state of things could exist. Mr. Radcliffe urged, therefore, as a final recommendation, giving force to such other recommendations as he had to make, the appointment of a definite sanitary officer. He recommended, in fact, the substitution of a sanitary supervision and management of the hospital, based on precise data and skilled knowledge, for the rule-of-thumb sanitary management and supervision which had previously obtained. He recommended, in fact, in this particular case, what Dr. Buchanan urges as a general rule.

Just as a local sanitary authority needs for its assistance a skilled sanitary adviser in the form of a medical officer of health, so the governing body of a hospital needs, according to Dr. Buchanan and Mr. Netten Radcliffe, a medical officer who shall

perform the same functions within the hospital. The different sanitary faults which discredit our newest hospitals, and are detrimental to the old, fostering traumatic infections within the wards, are faults which chiefly arise from the want of such an officer.

THE DISPOSAL OF SLOP-WATER.

Slop-water, to the rural medical officer of health, is a source of unlimited vexation; to the Rev. Henry Moule it is a source of indefinite profit. The former, represented in this instance by Dr. Cornelius B. Fox, regards it as the cause of much obnoxious nuisance;[1] the latter, as the unappreciated agent of much gain in garden-stuff, beneficial alike to body and purse.[2] Dr. Fox, in brief, deals with the subject as it is; Mr. Moule as he would have it be.

But the crowning vexation in regard to slop-water is, that the medical officers of health cannot deal with it as sewage, even though it may flow from sewers. Dr. Fox, in a correspondence with the Local Government Board on this subject, has elicited the legal opinion that slop-water is not sewage, and cannot therefore be dealt with under specific clauses of Acts which refer to sewage. This opinion is founded upon a judgment of Vice-Chancellor Kindersley, in which that learned judge observed that "the word sewer comes from the word 'to sew,' *i.e.*, to drain, and has a much more extended signification (than drain) embracing works on the largest scale, such as draining the fens of Lincolnshire by means of canals, &c. In the common sense of the term, it means a large and generally underground passage for fluid and feculent matter, from a house or houses to some other locality," &c. Here it is taken by the legal advisers of the Local Government Board that the word feculent has not its ordinary meaning, but that it is used with a special limitation

[1] The Disposal of the Slop-water of Villages. By Cornelius B. Fox, M.D., Medical Officer of Health of Central and East Essex. (Churchill, 1875.)

[2] National Health and Wealth promoted by the general adoption of the Dry Earth System, including the Safe, Inoffensive, and Profitable Disposal of Liquid Refuse. By the Rev. Henry Moule, Vicar of Fordington, Dorset.

to *fæcal*, in the sense of excremental matter, that is, ordure. That is to say, that the learned judge, when speaking of the common usage of a word (sewer) which had other and wider applications, interposed without explanation another word having a received common meaning in a strictly technical sense! Turning to the last edition of Webster, we find of feculent, "foul extraneous, or impure substances; abounding with sediment or excrementitious matter; muddy, thick, turbid." Then again, it is equally implied that the judge set aside the common meaning of "sewage," namely, "the contents of a sewer, refuse liquids, or matters carried off by sewers," (Webster), substituting a wholly unrecognised and previously unheard-of definition. And again it is further implied that the definition of "sewers" and "drains," and the usage throughout the Sanitary Acts of "drainage" and "sewage" as convertible terms, must be interpreted with reference to this opinion of Vice-Chancellor Kindersley as to a limited common usage! It may be so, but as the whole of this series of cross-meanings rests upon the signification presumed to have been attached to the word "feculent" by the Vice-Chancellor, we are disposed to think that he used the word not in the sense assigned, but in its common accepted sense, just as he was speaking of sewers in "the common sense of the term."

Dr. Fox himself did not, in fact, escape a similar kind of error when he raised the question with the Local Government Board. When he asked the question "Is slop-water included under the title of sewage?" he raised a false issue. No such distinction as he there implied has to our knowledge before been suggested. Slop-water, that is, "dirty-water; water in which anything has been washed or rinsed" (Webster); that is, "foul with extraneous or impure substances" (feculent); that is, "refuse liquids or matter," fitted to be carried off by sewers, to wit, sewage. The common distinction between slop-water and sewage in ordinary use is not a distinction of difference, but a distinction of certain constituents of sewage. To restrict the signification of sewage to the proper contents of a water-closet, involves an absurdity, consistent more with the muddled sanitary administration of the Local Government Board than with the customary judgment of the Bench.

But Dr. Fox is most concerned with an expression of opinion

of the Local Government Board, that as slop-water, not being sewage, "it might not be illegal, in the sense of an offence against the sanitary laws, to convey the slop-water whether deodorised or not into a water-course; but in such a case there might occur a breach of private rights." Where this may not be illegal of slop-water, is it not equally so of sewage? The question is rather if slop-water be not sewage, does this limit the power of sanitary authorities in dealing with the evils arising from its flow into streams? It would possibly be so with regard to section 10 of the Sewage Utilization Act of 1865, but hardly else. Dr. Fox's difficulty, however, consists more in the fact that the restrictions upon local authorities in dealing with slop-water are too great; and he blames the Local Government Board for not permitting a local authority to send the slop-water of a village into a river, after having declared that it was not illegal to do so; but he overlooks the fact here that the question was not of slop-water but of the outlet of a sewer, and that sanitary authorities are debarred from making a sewer which shall drain into any stream or watercourse by the Sewage Utilization Act of 1865. It is not easy to understand how sanitary authorities may get slop-water into a stream or water-course without a sewer, and they may not construct a sewer with such an outlet. Hence sanitary authorities must look for some other means of dealing with slop-water than pouring it into streams, and Dr. Fox discusses the different means at their disposal. He describes filtration by filters constructed after the Bradford pattern, with peat charcoal, and by filters constructed after an ingenious design of Mr. Haviland's, and he describes also the means by tank or cesspool in porous soils, by sub- or surface-irrigation of gardens or other grounds, by Dr. Bond's method of precipitation and filtration, and by the admission, when exceedingly diluted by waste water of manufactories, into canals and large rapid rivers. For the different special processes we must refer to the book itself, which is a most useful manual on the subject. As to the admission of slop-water into canals and rivers under certain conditions, Dr. Fox touches a question which we trust will receive careful attention in the discussion on the Rivers' Pollution Bill now before Parliament. The main point is, as he well puts it, that it should be rendered "impossible to introduce any slop-water

into a water-course which is used, or likely to be used for drinking purposes." Subject to this restriction, considerable discretion should be permitted to local authorities in finding outlets for slop-water in canals and rivers, short of producing nuisance. If the provisions to secure rivers and water-courses from pollution be too stringently and generally drawn, they will necessarily lead to greater evils than the nuisance which it is sought to prevent.

But we say all this to meet the immediate practical needs of the moment, and without a trace of desire to imply that Mr. Moule is wrong in his opinion, that to pour slop-water into canals and streams is wicked wastefulness. Now he says: "I find by careful experiment that the liquid refuse [slop-water] of a family, as many as ten in number, if applied daily in due succession [through alternate cropping] to the plant and to the soil, may be safely and inoffensively disposed of on sixteen perches of ground. And a cottager with a garden may from these sixteen perches, from the produce of an earth-closet, and from a pen of twenty fowls occupying a perch of ground, raise that which shall be equal to £20 a-year. The fowl pen has a second object, namely, that of being a substitute for the dungheap and the pigstye. The soil within it should be left in its natural state; all waste matter should be thrown into it, and anything good for manure. And if it be turned over once a fortnight, the cottager, in addition to two thousand eggs, might make in a year one or two tons of manure. These, together with the contents of the closets, he might sell to the manure manufacturer, or to the farmer. The two together must be worth more than the barley he would require for his fowls." This, as we have satisfied ourselves, is a simple statement of fact, and it is in this direction that the education of cottagers having garden-ground is needed. We hope to live to see Mr. Moule's teachings in this respect bear as good fruit as his teachings in relation to the dry-earth closet.

But Dr. Fox entertains a doubt whether the increased dampness of soil arising from sub- or surface-irrigation with slop-water might not prove detrimental to the health of the people living near to the irrigated ground. With not a little knowledge of irrigated spots, the possibility of such harm, we must confess,

has never occurred to us. Nor, indeed, can we conceive of such dampness occurring even in retentive soils except under conditions of management which would render it requisite for the sanitary authority to interfere. We trust that further experience of irrigation will remove this doubt from Dr. Fox's mind—a doubt which must impede the progress of such desirable knowledge as that which Mr. Moule teaches us.

ERYSIPELAS AND CHILD-BED FEVER.[1]

At a time when child-bed fever has been occupying so much of the attention of the Obstetrical Society of London, and the profession here generally, a contribution to the question discussed from the United States, but independently of the discussion, has peculiar interest. Not that the United States was unrepresented in the discussion in the metropolitan society, for Dr. Fordyce Baker, of New York, took part in it. The contribution to which we now refer is a work by Dr. Thomas C. Minor, of Cincinnati, in which he enters into an elaborate examination of the relations of child-bed fever to erysipelas as observed in the United States in the census year 1870, and gives also a history of an epidemic of child-bed fever in South-Western Ohio in the winter of 1872. The number of deaths from erysipelas registered in the United States in 1870 was 3,162, and of child-bed fever 1,828. The greater number of the deaths, both from erysipelas and from child-bed fever, occurred in March, and generally these diseases appear to be most fatal in the States during the first quarter of the year. No class of population was exempt from them; but while the proportions of deaths from child-bed fever among coloured women and native-born white women were about the same—namely, 1 in 12,000 coloured, and 1 in 11,800 native-born white; the proportion of deaths from erysipelas among the coloured and native-born white population was as 1 to 3—namely, 1 in 39,000 coloured, and 1 in 10,500 white. But no such difference of

[1] Erysipelas and Child-Bed Fever. By Thomas C. Minor. M.D. Cincinnati, 1874.

incidence of the disease upon the two races as is to be inferred from these figures was observed during the war among the troops engaged in the field. There were no indications from the figures of any special distribution of the mortality in relation to the climatic conditions of particular districts. Deaths from the two diseases were recorded at all seasons of the year in the various divisions of the States, but it is to be concluded from a study of the whole series of figures that, in the absence of any epidemic tendency, a woman's ordinary chances of escaping child-bed fever are twice as good in summer as in winter or spring. Altitude appeared to exercise some influence upon the distribution of the deaths, for the greater number of deaths from erysipelas occurred at higher altitudes than those from child-bed fever. A comparison of the deaths with the state of season as to wetness or dryness disclosed no particular relationship in this respect. But an examination of the relationship of prevalence of the two diseases to each other brought out the following conclusions :—

1. Erysipelas and child-bed fever seemed to prevail together throughout all the States.

2. Any marked increase in any one locality of one disease was apparently accompanied by a corresponding increase of the other.

3. Where histories of past epidemics of either disease was obtainable from any of the States, the apparent connection of the two diseases was noticed by physicians at the time of such epidemics, and remarked on.

4. This relationship indicates that there is an ultimate connection existing between child-bed fever and erysipelas, and justifies the inference that in any place where erysipelas is found there will be found puerperal fever.

Proceeding to an examination of the results of an epidemic of child-bed fever in Cincinnati, Dr. Minor finds confirmation of the foregoing conclusions, and is enabled to push them further. From these results it followed that :—

1. The two diseases, child-bed fever and erysipelas, prevailed at the same time in the same localities.

2. Where an isolated death from child-bed fever was noted outside of the infected districts, a corresponding death from

erysipelas was noted in the same locality. This was almost invariably the case.

3. Infants die of erysipelas shortly after or before their mothers die of child-bed fever.

4. A few physicians attending child-bed fever cases and erysipelas cases at the same time, as exhibited by the death-register, were the most unfortunate in their practice.

5. Physicians having large obstetric practices, but who were known to be believers in the close connection of child-bed fever and erysipelas, returned few death-certificates from either cause.

6. These results confirm the opinions of the intimate connection between the two diseases.

But it may be said that a not less close connection might be shown between the prevalence of child-bed fever and typhus and scarlet fever. This view Dr. Minor subjected to the test of the data he possessed on the subject from the census report and other sources, and without denying that some connection may exist, he has formulated the following propositions:—

1. Epidemic typhus is not always associated with an outbreak of child-bed fever.

2. Epidemic scarlet fever is very seldom associated with an outbreak of epidemic child-bed fever, or *vice versâ*.

3. Epidemic erysipelas is *invariably* associated with an outbreak of epidemic child-bed fever, or *vice versâ*.

If it be asked what was the bond of the connection between erysipelas and child-bed fever here maintained, the same conclusion is suggested by the American as by the English experience—namely, chiefly *the doctor and the nurse*. It is mainly a question of the communication of erysipelas to the woman in child-bed by contagion, not a question of some occult relationship. This is not the whole question of connection, but it is the essential portion of it.

THE PRACTITIONER.

SEPTEMBER, 1875.

Original Communications.

ON THE DIFFERENCE OF THE ACTION OF INDUCED AND CONTINUOUS CONSTANT CURRENTS ON THE NERVOUS SYSTEM.

BY DR. ONIMUS, OF PARIS.

(*Continued from* p. 106.)

Induced and continuous currents having a different action on organic tissues—the muscles, for example — it is intelligible that this difference may be still more marked for tissues so impressionable as the nerves, and which are so sensitive to the least differences in the kind or strength of stimuli.

The mode of action of induced currents is easy to comprehend, since each time that they are transmitted they give a shock which constitutes a stimulus. The intensity of the stimulus thus produced is proportionate to the violence of the shock or succussion caused by the current. The two induced currents differ from each other in their action on the nervous system; the opening current is always a stronger stimulus, not only because it is of higher tension, but because, as we have seen, it is of much shorter duration. It is an electro-physiological law that electrical excitation is intense in proportion to the shortness of its duration; or, in other words, the excitation of a nerve

depends less on the absolute amount of tension of a current than upon the changes of this tension from one moment to another.

The short duration of induced currents thus explains their powerful action on the nerves; they rapidly and sharply modify the molecular condition of the nerve. They have no electrolytic action on the nerves, and if they ultimately cause the nerve to lose its excitability, this is not owing, as in the case of continuous currents, to a chemical alteration, but to the succession of shocks they have caused.

The effects of discharges from a Leyden jar are exactly similar in their essential characters with those of induced currents.

When two rheophores are placed on a nerve, contraction of the muscles innervated is caused by each shock of induced electricity, whether the current passes in the ascending or in the descending direction (the latter, however, giving the most extensive contractions); but when the two rheophores are placed upon two different nerves, and the current is very feeble, the shock only occurs on the side which responds to the exit of the induced current. (Chauveau.)

The therapeutic consequences that flow from these physiological facts are very easy to understand; and they are at the same time so simple that it is useless to insist upon them here. It is not the same with continuous currents, which have given rise to a large number of theories and hypotheses. Since the discovery of the pile, experimenters have been much occupied with this question, who for the most part have not been contented with the study and discovery of special facts, but have endeavoured to lay down general laws. For some years past the works of M. du Bois-Reymond have led all physiologists to admit the identity of the nervous influx and the electrical phenomena that exist in the nerves. The laws of electrotonus discovered by Pflüger have tended to confirm in the minds of practitioners the theory of Du Bois-Reymond, and scarcely any attention has been paid to the objections made to them originally by Becquerel and Matteucci.

M. Cyon, in his work on the principles of electro-therapeutics,[1] in which he has given so full an exposition of these questions of electro-physiology, does not hesitate at all to state that the

[1] Cyon, "Principes d'Électrothérapie." J. B. Baillière. Edit. Paris, 1873.

"identity of the vital force, and of the electric properties and capabilities of the nerve, cannot be admitted." "Supposing even," he goes on to observe, "that we are determined not to regard the electro-motor properties of the nerve *as being the cause* of the nervous functions themselves, as being that which we have so long named nerve force, no person will doubt that the electro-motor properties exert a very great influence upon the functions of the nerve, at least none of those who are acquainted with the present state of neuro-physiology, and especially amongst those who are familiar with the doctrine of electro-tonus."

All the German physicians have made the laws of electrotonus the basis of the effects excited by electric currents on nerves and on muscles; and Dr. Cyon even believes that electrotonic differences may be recognised between the healthy man and choreics and epileptics.

We have already endeavoured to show how these theories of electro-physiology rest on facts which are exact, it is true, but the interpretation of which has been erroneous. The importance of these questions compels us to complete our criticisms, and the more so since their application to therapeutics is intimately connected with these researches.

Of Electric Currents in the Tissues.

Galvani was the first who discovered that an electric current existed in animal tissues; and his observations were corroborated and completed by Matteucci and Du Bois-Reymond. The last named experimenter determined, with much exactitude, the different laws that govern the currents in nerve and muscle. The principal law may thus be expressed:—

Each point of the longitudinal surface of a nerve or of a muscle is positive in relation to the points of the transverse surface.

Must we then conclude, with Du Bois-Reymond and his school, that a special production of electricity takes place in the muscles and in the nerves? And do these currents constitute the nervous agent or nerve-force? In reply, it may be said that

similar electrical phenomena are found in all tissues; and from the time of the very first publication of these researches, M. Becquerel observed the same phenomena in all animal and in all vegetable tissues. In a potato the same currents exist, passing in the same direction. Yet here there is neither contraction nor nervous influx.

Since then M. Becquerel has found similar electric currents in the bones, in the tendons, and in arteries. M. Cl. Bernard had in like manner previously discovered the cutaneous and musculo-cutaneous currents. In a word, there is no living organic substance which does not manifest these electric currents.

The cause of these currents is the chemical action taking place in the tissues, and it is well known that all chemical action is accompanied by a disengagement of electricity. Hermann has pointed out also that all the laws of the muscle and nerve current can be explained by the different chemical reactions that take place at the points of the longitudinal and of the transverse surfaces. This being more exposed to the air, decomposes more rapidly, and every point where the decomposition has taken place becomes negative in regard to those which are unaffected or only slightly affected: hence the longitudinal surface is positive in regard to the transverse surface.

The experiments of M. Becquerel have been the most searching in this respect, for on reducing the muscular tissues to a paste, he obtained, on connecting the internal with the external surface, a current which passed from the interior to the exterior, that is to say, from the part which was less oxidised to that where it is more oxidised, in consequence of its being in contact with the external air. Moreover, if the muscles are plunged into nitrogen or into hydrogen, there is in the first instance a current passing from the interior of the muscles to the exterior, which after a little while diminishes, becomes *nil*, and at last manifests itself as a current passing in the opposite direction. This reversal of the current can only be attributed to the difference of oxidation of the parts of the muscle, for the internal parts of the muscle still contain oxygen when the surface is completely deprived of it.

Thus there is nothing special in the electric currents that are observed in the nerves and in the muscles; the same currents are met with in all the tissues, and the differences in the chemical actions that are taking place explain their direction.

These electric phenomena are almost all governed by the laws of electro-capillary currents, the principle of which, discovered by M. Becquerel, is that two solutions of a different nature, capable of conducting electricity, and separated by an organic membrane or by a capillary space, constitute an electro-chemical circuit.

Negative Oscillations of the Current.

The variations that occur in the electric current during excitation of the nerve have been advanced as proofs of the identity of the nervous influx and the electro-motor properties of the nerve. Let us see in what this phenomenon consists:—The electric currents proper to the nerve or muscle disappear when the nerve is excited or the muscle is made to contract.

From this the conclusion has been drawn that the nerve in a state of repose possesses different electro-motor properties than when in activity, that the performance of its function brings about a corresponding modification of its electro-motor properties.

This phenomenon however becomes perfectly intelligible if we admit that the divergence of the needle is due to a difference of chemical activity at the points in connection with the galvanometer. In repose certain points being more actively oxidised than others in consequence of their exposure to the air, a current is produced as a result of this inequality of oxidation—a differential current which is proportional to this relation—whilst in the active performance of function the chemical phenomena become identical in all parts of the nerve or muscle; the internal oxidation of the tissue is effected at all points, and as the current established in repose is only the result of a difference of oxidation, it is evident that it ought to disappear as soon as this difference itself disappears.

We have already referred to the experiment of M. Becquerel, in which the current which passes at first from the interior of the muscle to the exterior, falls to zero, and then becomes reversed. The time during which the current is *nil* corresponds to that during which the decomposition takes place to an equal amount.

externally and internally. The existence of the current demonstrates a difference in the chemical activity of the points examined. By our own researches on man we have been able to verify the truth of this proposition. In patients affected with very complete anæsthesia, in whom the platinum electrodes could without any pain be buried in the muscles, we have observed the following facts[1]:—

When the needles are each buried in a muscle, and the muscles are in the same anatomical and physiological conditions, no current is observable, the needle of the galvanometer, however sensitive, remaining stationary; but if one of the muscles be made to contract, the other being quiescent, a divergence of the needle immediately occurs, indicating that the muscle in contraction is negative as compared with that in repose. In this case we obtain, then, the same phenomenon as in the case of a single muscle, when the external surface is negative as compared with the internal, which is attributable to the greater chemical activity of the part exposed to the air. In the same way in comparing two muscles, that in which the chemical activity is greatest, that is to say, the one which is contracted, becomes negative in relation to that in which the chemical phenomena are less, that is to say, which is in a state of relaxation.

The same phenomena are observed to occur on comparing pathologically contracted with healthy muscles. Thus, on connecting pathologically contracted and healthy muscles with a galvanometer in a state of repose, the latter are positive as compared with the former; but if the healthy muscles are excited to contract and maintained in a state of contraction, the current weakens, becomes reduced for a moment to zero, and then undergoes reversal. In analysing these phenomena in regard to the nutritive activity taking place in these organs, their perfect accordance with our proposition is obvious: a living tissue assumes in relation to the very same tissue the negative electric sign when the phenomena of oxidation are more pronounced in it.

Thus, in the experiment above given, the pathologically con-

[1] Our researches were made at the Hôpital de la Salpêtrière on patients under the care of M. Charcot, and we take this opportunity of thanking M. Charcot for his courtesy.

tracted muscle, in which the phenomena of oxidation in consequence of this contracted state are more intense, is negative in relation to a healthy muscle in a state of relaxation; but if this last augment its chemical activity by a prolonged contraction, the current at once disappears, and then undergoes reversal, because the contraction of a healthy muscle is accompanied by more energetic processes of oxidation than the pathological contraction of other muscles.

Additional evidence in favour of our explanation is found in the difference of reaction that may be observed to take place in this point of view between the different kinds of contracture. A muscle that has long been pathologically contracted, the permanent contraction of which is in general accompanied by a diminution of heat and of circulation, instead of being negative in relation to other muscles, is, on the contrary, positive. There is less nutritive activity in it than in a muscle in a state of relaxation.

We may admit the existence of two kinds of contractions —an active and a passive.

In the first, the nutrition of the muscle is still energetic, the contraction is strong, and in all respects still resembles physiological contraction. In passive contraction, on the contrary, there is, as it were, a physical shortening; and in all cases all the other symptoms show a great diminution in the processes of nutrition. It is in this case that we find that the electric condition, instead of being negative, as in active contraction, becomes positive when compared with healthy muscles in repose.

Moreover, in active contraction we have always been able to ascertain the occurrence of further shortening on electrifying these muscles with induced currents, which does not take place in passive contraction. In this last no alteration of form takes place, notwithstanding the application of the most energetic electric stimuli. These two kinds of contraction may be observed in the same patient. Passive contraction may persist for years, and resist every kind of treatment; whilst active contraction, in which a negative electric state occurs, and where the application of electricity still occasions a shortening more considerable than that caused by the pathological stimulus, recover.

The chemical actions that take place in the living organism depend upon, or rather constitute, nutrition; on the other hand, the electric currents which occur naturally in living tissues, being the result of chemical actions, it may be concluded almost *à priori*, that the electric currents would be energetic in proportion as the trophic activity of the organs is greater. We have in fact observed, in patients whose limbs were paralysed or contracted, that the natural electric currents were much more feeble than in the healthy limbs. To show this, however, cases of long standing must be selected, for such affections do not exhibit these phenomena at the outset and on the same individual; it is necessary to compare, as far as possible, thoroughly affected with thoroughly healthy limbs.

Electrotonic State.

If a galvanic currrent be made to traverse any portion of the course of a nerve, this presents throughout its whole length a change of state which is manifested by an augmentation or a diminution of its proper electric currrent. If the current of the battery passes in the same direction as that of the nerve current, this is augmented in intensity; it is, on the contrary, diminished if the direction of the two currents is inverse. Then at the moment that a voltaic current (P, Fig. 4) is made to traverse

Fig. 4.

any portion of the nerve, a current in the same direction is produced throughout the whole length of the nerve, both below and above the point electrified.

The electric current, which is thus developed outside the points to which the poles are applied, does not exist when a current is passed through a metallic rod; this phenomenon is then extraneous to the physical laws of electricity, and is peculiar to the nerves. But Matteucci, in 1868, demonstrated that exactly

the same phenomena are obtained with all bodies capable of undergoing electrolytic action, as with sections of potato, stalks of cabbage, with muscles, and with nerves. In the case of the nerves it is by no means requisite that they should be fresh; it is sufficient if their structure is not altered, for the phenomena of electrotonus disappear when the nerve is compressed at any point in such a manner as to destroy the homogeneity of the cylinder axis. Matteucci believes, from experiments made on such substances as moist chalk or vegetable tissues, which give secondary currents much more energetic when they are traversed longitudinally by a metal wire, that the cylinder axis enjoys in the nerve the function of being a better conductor, and that it is on it that the products of electrolysis are deposited?

The principal experiment of Matteucci consists in covering a platinum wire, about a yard long and a millimetre in diameter, with two layers of hemp or cotton. This wire is dipped in salt water, and arranged as in the experiment for electrotonus.

As soon as a current of electricity is applied at a given point, a strong electrotonic current is obtained even at a distance of 30, 40, or 60 centimetres (one to two feet) from the electrodes of the battery.

It thus appears that the electrotonic state is by no means a special property of the nerves, and that consequently all theories resting on this view have no solid foundation. We may even cite an experiment we have made ourselves, and which shows that phenomena, analogous to those of electrotonus, exist in all the tissues in the living subject.

In patients affected with anæsthesia, if the platinum wires be inserted into the fore-arm (at *a* and *b*, Fig. 5), and be then connected with a very sensitive galvanometer G, a divergence of the needle is obtained on electrifying the patient with a current of 10-15 Daniell's elements at the points P and N, and even on applying the poles at a still greater distance on the back. The divergence of the needle, in one sense or the other, depends on the current of the pile acting near the shoulder, and is always in relation with the direction of this current.

We see, then, that the electrotonic state—that is to say, the transmission of the current beyond the points of application of the electric currents, is far from being a property special to the

nerves. It is impossible, therefore, to draw from this phenomenon any conclusion in regard to the supposed electro-motor modifications that the nervous molecules undergo at the moment of performing their function.

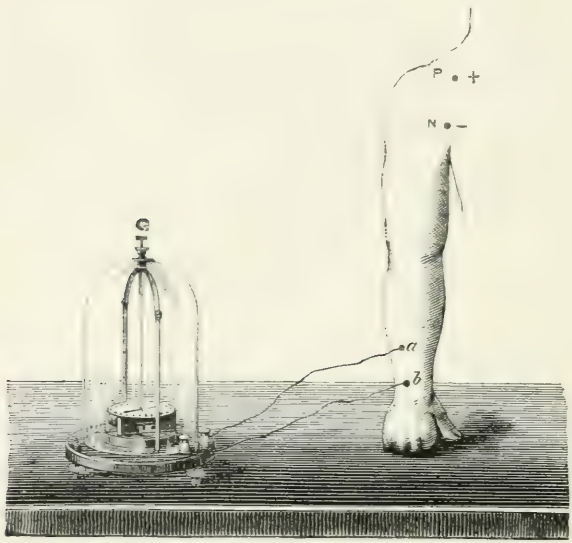

Fig. 5.

Cathelectrotonus and Anelectrotonus.

Pflüger has endeavoured to complete the indications furnished by Du Bois-Reymond, and the fundamental experiment on which he has founded his theory consists in electrifying a nerve through a determinate portion of its length, and then examining the state of irritability of this nerve in its different parts. He has observed that in these conditions the nerve is divided into two parts: in one, which adjoins the negative pole, the irritability is augmented; in the other, which is around the positive pole, the irritability is, on the contrary, diminished. Pflüger termed the zone where the irritability is augmented, and which is around the negative pole, the Cathelectrotonic zone, and that in which the irritability is diminished, and which is in the neighbourhood of the positive pole, the Anelectrotonic zone.

It is on this fact that all the theories of electrotonus have been established, though the explanation of this phenomenon is one of the simplest and most elementary in physiology.

If there be a loss of excitability near the positive pole, and augmentation of excitability around the negative, it is due, as Matteucci and Becquerel have stated, to the nerve in contact with the negative pole becoming charged with hydrogen and alkali.

Let me here once more state the fact that we have on several occasions alluded to, and which we have in the preceding memoir adduced against the experiments of M. Vulpian, that a galvanic current never traverses a nerve, especially when it is in direct contact with this nerve, without producing a manifest electrolytic action an action which extends beyond the poles and which is particularly pronounced at the points of application. The passage of a galvanic current in a tissue and the electrolytic action are absolutely inseparable events; the one cannot take place without the other.

But in these conditions attention ought to be paid not only to the influence of the passage of electricity, that is to say, to the molecular change taking place throughout the whole circuit, but in addition to a chemical action which is an important cause of molecular change, and which takes place especially at the points where the poles are applied.

But it has long been known in physics that dilute acids diminish the excitability of nerves, and that dilute alkalies augment this excitability. There is nothing astonishing, then, in this excitability being augmented around the negative pole where the alkalies are formed, or in its being diminished around the positive pole where the acids appear. This effect is produced even with a very feeble current, as may be seen by the reactions of litmus paper.

It is perfectly useless, then, to seek in these hypotheses on the electromotor state of the nerve molecules the explanation of phenomena which solely result from the physical and chemical effects of the currents.

Attempts have been made to find a confirmation of the theory of Pflüger in the alternations of contraction that are produced by electrifying the nerves with ascending and descending currents.

The law of Pflüger bearing upon these commotions may be formulated as follows :—

A certain extent of nerve being given, this is excited by the occurrence of cathelectrotonus and by the disappearance of anelectrotonus, but it is not excited by the disappearance of cathelectrotonus and the appearance of anelectrotonus.

"The cause of this law," says Cyon,[1] "is easy to understand if it be remembered that on the appearance of cathelectrotonus and on the disappearance of anelectrotonus the nervous molecules pass from a state of lesser to a state of greater mobility, whilst the converse takes place on the disappearance of cathelectrotonus and on the appearance of anelectrotonus. The law of commotion of Pflüger may be expressed in a modified form as follows :—The nerve is excited when its molecules pass from their ordinary state to a state of greater mobility (cathelectrotonus), or when they pass from a state of less mobility (anelectrotonus) to their ordinary state. The nerves do not experience any excitation, on the other hand, either on their passage from their ordinary state to a state of less mobility (anelectrotonus) or during their passage from a state of greater mobility (cathelectrotonus) to their ordinary state."

However ingenious and seductive this theory may be, we shall proceed to show that all these alternations of commotions which since the time of Galvani have attracted the attention of observers, may be explained by attending to two facts that are perfectly well established and easy to verify.

The first of these facts is—

That the descending or direct current is that which acts most energetically on motor nerves ; or, in other words, *the descending current is that which most strongly excites muscular contractions.*

The second of these may thus be expressed :—

Every current, when applied to a nerve, determines a current in the opposite direction at the moment of its cessation.

We have already insisted upon these two phenomena elsewhere,[2] and we could only repeat here what we have already said. We shall only add, that the influence of the descending current is demonstrated by a great number of experiments, and

[1] Cyon, "Principes d'Électrothérapie," 1873, p. 103.

[2] "Traité d'Électricité," p. 229, *et seq.*

that this action is exerted both on peripheric nerves and on the spinal cord and apart from all electrolytic action. This influence of direction is a very important point to consider, but is one which we cannot insist upon here, since it is beside the question under discussion.

The following Table, which is almost the same as that given by Nobili, indicates the principal results that are obtained on electrifying a motor nerve :—

		DESCENDING CURRENT.	ASCENDING CURRENT.
First period .	Closure . .	Contraction	Contraction.
	Opening . .	Contraction	Contraction.
Second period .	Closure . .	Contraction	Feeble contraction.
	Opening . .	Feeble contraction	Contraction.
Third period .	Closure . .	Contraction	○
	Opening . .	○ [1]	Contraction.
Fourth period .	Closure . .	Contraction	○
	Opening . .	○	Feeble contraction.
Fifth period .	Closure . .	○	○
	Opening . .	○	Feeble contraction.

In regard to the current which is formed at the moment when the principal current ceases, we have given the explanation of it in the first part of this memoir (on currents of polarisation). This current may be more intense than that which has been applied if the electrolytic action is sufficiently strong, and especially if it have been prolonged for some time. This current often lasts for several minutes; but its maximum occurs at the moment when the polarising current ceases.

Thus, each time that a nerve is electrified with an ascending current there is formed at the moment of breaking a descending current in the interior of the tissues, and reciprocally at the moment of breaking a descending current an ascending current is formed.

This being granted, we shall now proceed to examine the principal experiments that have been made upon the nerves, and we desire to point out at the outset that these experiments for the most part have been made by applying the poles directly to the nerves, with the consequent production of local electrolytic actions. When on the contrary we study, as M.

[1] Signifies no contraction.

A. Bernard has done, the action of currents on the nerves without determining local chemical alterations, we always provoke with either an ascending or descending current, a contraction on closure of the current and occasionally on opening. This results from the fact that the current on closure is that which under these conditions provokes most rapidly changes in the intimate molecular state of the nerve, which is always the principal cause of the irritation of the nerves.

Thus, in the first period, the excitability of the nerve being undiminished, contraction of the muscle takes place as soon as its molecular state undergoes alteration, which occurs both at the moment of closure and of breaking, then by degrees contraction only takes place on the closure of the descending current and on the opening of the ascending current.

But the opening of the ascending current is equivalent, as we have said, to the formation of a descending current; that is to say, that with these two directions the muscle contracts simply with a descending current.

In the same way, at the moment of breaking a descending current, an ascending current is formed which remains without action on the muscles, like the ascending current of the battery.

At the fourth period the ascending current does not give the contraction of opening, except under the condition that the current of the battery has been applied for some time, for then the polarising current (descending) becomes more energetic. Moreover at the fifth period, when the current of the battery no longer gives any contraction, it may still be sometimes obtained by the polarising current.

We thus see that all these alternations are subordinate to a single and simple law, as soon as we take into consideration the formation of polarising currents and the greater action of the descending current.

This alternation can be rendered very intelligible by the two subjoined tracings (Figs. 6 and 7) which have been obtained by electrifying the facial (but already exhausted) nerve of a rabbit. The tracing represented in Fig. 6 has been obtained by electrifying the nerve with a descending current. It is seen that contraction only occurs at the moment of the closure of the current; and it may at the same time be observed that the muscle does

not immediately resume its normal state, and that during the whole period of the passage of the current it remains slightly contracted (the electric current was applied at A and removed at B). This slight contraction, which persists as long as the current passes, is connected with the chemical irritation which occurs during this period.

FIG. 6.

The tracing (Fig. 7) shows the contraction with the excitation of the nerve by an ascending current; here the real contraction only takes place at the moment of closure (? formation of a descending current). Even in its graphic form the contraction resembles that which occurs at the moment of closure of a descending current.

FIG. 7.

Thus, if we examine all the other experiments that have been made with galvanic currents on the nerves, we find everywhere the same explanation holds good, even for the most complicated phenomena.

It is thus in regard to the law of alternation of Volta and of Ritter, when a nerve is electrified for some time the excitability of the nerve is diminished for currents passing in the same direction, whilst it is augmented for those passing in the opposite direction. This law is easily intelligible, because under these conditions the currents passing in the opposite direction come

to reinforce and add themselves to the polarising currents, whilst currents passing in the same direction are enfeebled by these same polarising currents, which always run in the opposite direction.

It is equally well known that when a nerve has been traversed for some time by an ascending current, tetanus frequently supervenes on breaking it, which lasts for a longer or shorter period. This tetanus, or this series of contractions, is due to the formation of descending polarising currents, which, having a certain duration, produce tetanic irritation.

The law of alternation of Volta, has been slightly modified by Rosenthal, who thus expresses it :—"There is augmentation of irritability at the moment that the current which is in action is interrupted, and at the moment that a current passing in the opposite direction is produced. On the contrary, there is a diminution of irritability at the moment when a current passing in the same direction as the first is produced, and at the moment when a current in the opposite direction is interrupted. This law, to sum up, states that there will be augmentation of irritability each time that, on the cessation of the current, a current is made to act in the same direction as the polarising current, for they add themselves together ; there will be diminution of irritability each time that a current is made to pass having a contrary direction to the polarising currents for they then oppose one another."

We can just as easily explain induced or secondary contractions : the phenomena are invariable and always depend upon the two principles we have enunciated above.

M. Cyon,[1] has made some very curious and very interesting experiments on man, in which he has found that the amount of contraction was greater during the passage in the nerve of a descending current, and more feeble with an ascending current. M. Cyon has endeavoured to show that these facts prove the existence of electrotonus in man ; but his experiments, as he himself states, succeeded only occasionally, and often gave contradictory results, especially when the irritation was applied above the region traversed by the current.

On analysing the four experiments of M. Cyon which gave

[1] *Loc. cit.* p. 130, *et seq.*

satisfactory results, we find only the proof of the greater action of he descending current on the muscular contractions.

This is in point of fact the outcome of all the experiments that have been made upon the peripheric nervous system, and it deserves to be brought out in strong relief, for not only does it give the explanation of a whole series of electro-physiological experiments, but it is important in practice in its therapeutical applications.

We have lingered long on these questions of electro-physiology because they have been widely discussed ; and for more than thirty years they have governed physiology and even therapeutics. We have seen that all the facts in succession on which the theories rest admit of an easier explanation, and one which is more conformable to the laws of electric currents.

Is it necessary, then, that we should place no value upon all these phenomena, and hold that the electric currents that exist in the tissues are of no importance ? By no means, for we believe on the contrary that the question is a highly important one; only in place of limiting these electrical currents to the nerves and to the muscles, we have seen that they are the property of all the tissues. They everywhere accompany chemical reaction and consequently nutrition. They are the result of changes taking place in the organic substratum and constitute one of the manifestations of life. It may now even be said that every living element not only nourishes itself and produces heat, but also that it determines the productions of electrical currents. We have already endeavoured to show the influence of the currents that can be artificially made on the natural electrical currents; it is exhibited in a dynamical change, which leads as a consequence to an augmentation of nutrition.

In regard to the nervous system, the great mobility of the molecules of that system, and the direction in a determinate sense of the influx of nerve force, explains the powerful influence of electrical currents : and as these electric currents themselves consist in a flow always taking place in a definite direction it is obvious that according to their direction they will exert a variable action. We cannot dwell here on all these facts, which are outside the limits of this essay ; but it is sufficiently evident that in the case of the nervous system there are differences of action,

not only between induced and continuous currents, but that the influence of these is not identical as soon as the conditions of production and of direction are not the same.

The therapeutical applications may easily be understood from these data, without its being necessary to lay them down in an absolute manner for each special pathological case. It may be said generally that there is no agent so powerful as induced currents to cause deep-seated, energetic, and sudden excitation. They have an exciting action very superior to continuous currents, and they ought always to be employed when it is desired to excite motor and sensory nerves; they act powerfully on the cutaneous nerves, and they are preferable to every other agent when it is required to produce reflex acts.

Continuous currents, on the contrary, change the molecular state of the nerves more slowly, but their action is more profound, more gentle, so to speak, even at the moment of their interruption; the commotion that they cause in the nerve is less mechanical, but has a polar influence more marked and more durable. In a word, their action is tonic and slightly stimulating, whilst that of induced currents is irritating and exciting.

Lastly, we here find again the applicability of the principles we have already given in a former paper, the chief of which may thus be explained:—Induced currents ought not to be applied to the central nervous system, whilst continuous currents should be applied almost exclusively to the nerve centres.

NITRITE OF AMYL IN FACIAL NEURALGIA.

BY GEORGE H. EVANS, M.D.,

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FINDING that one of the uses of nitrite of amyl does not seem to be as generally known among the medical profession as it should be, I think it may be worth while to put on record the few cases of this use of the drug that have come under my notice.

It occurred to me about three years since, on first becoming acquainted with the effect of inhalation of nitrite of amyl, which was then said to flush the small vessels (first of the face and then of the trunk) by paralysing the vaso-motors, but which at all events caused flushing of the face, &c., that it might possibly give relief in some of those cases of facial neuralgia which are obviously connected with, if not dependent on, anæmia. A case occurred which gave me an opportunity of testing this. A girl applied at St. Thomas's Hospital one Thursday morning about 11 A.M., trying to get some relief for neuralgia, which had prevented her (she said) from sleeping since the previous Saturday. She was evidently in considerable pain, and markedly anæmic. Hoping for a possible immediate effect, I made her inhale some nitrite of amyl. It took rather a longer inhalation than I expected to produce the usual flush: however, it came, and she then said that she felt a throbbing and a beating in her head, but that the pain was subsiding. In a very few minutes she said the pain had left her. I was very doubtful about the amyl producing anything more than simply temporary relief, so I told her to come again if the pain recurred. She did not come again to me; but she attended Dr. John Harley (she was already an out-patient under him) on

the Saturday, and said she had had no pain since the inhalation I did not see her again.

The next case in which I used it for this purpose was that of an anæmic young woman who was in St. Thomas's Hospital with acute rheumatism, and who during her convalescence suffered much from facial neuralgia, which she said had tormented her since childhood. On her the inhalation of amyl did not produce quite so striking an effect as on the former patient; but it invariably gave her relief, so much so that she said: "I wish you would let me take that little bottle out with me; I have tried all sorts of things, and never found anything do me so much good as that."

The third case I have to mention is that of a young lady who was, in September last, suffering from very severe neuralgia, whom I knew to be generally anæmic, and whom I noticed to be much more anæmic than usual at that time. She told me she was always paler when these attacks came on. I gave her some amyl to inhale: it was some time before it produced any effect, visible or otherwise; but as soon as it had produced a slight flush, she said the pain was relieved. I saw her three weeks later, and she told me that she always prevented the attacks of neuralgia by inhaling amyl when she felt they were coming on. One of her sisters, who was not anæmic, incautiously one day sniffed at the amyl bottle, probably because I had especially cautioned my patient against allowing any of her sisters to use it; and immediately her face became most painfully flushed, and she felt sufficiently uncomfortable to prevent her repeating the experiment. I think, from what I have seen of its use, that anæmic people (as one might expect) can bear very much larger doses of nitrite of amyl than those who are not anæmic.

SOME REMARKS ON PARACENTESIS OF THE CHEST.

BY HENRY BARNES, M.D.,

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THERE are few subjects in practical medicine of greater importance than the proper treatment of effusions into the pleural cavity, and yet there are few which have given rise to more discussion and to greater differences of opinion. It is my intention in the present paper to discuss the value of paracentesis of the chest, to consider the class of cases in which the operation is suitable, and the objections which have been urged against it, and then to make a few remarks on the best method of performing it. It cannot be considered a new operation, as specific directions for performing it in three different ways were laid down by Hippocrates, who recommended that the chest should be opened either by perforating a rib or using either a bistoury or the actual cautery for making the opening in one of the intercostal spaces. Although the subject has been treated of by most of the older writers, it is not necessary, for practical purposes, to go back into its history for more than thirty years. Until that time the operation was only looked upon as a last resort, and performed often when the patient was *in extremis*. This was perhaps rendered partly necessary by the difficulties of diagnosis. The discovery of Laennec rendered the detection of effusions into the pleural cavity a comparatively easy matter, and it was not long before physicians, wearied by the long continuance of effusions into the pleural cavity, in spite of all ordinary measures of treatment, began more frequently to try the effects of paracentesis.

To Trousseau is due the credit of being the first in modern times to advocate its advantages, and his success was so remarkable that it at once challenged criticism. The chief opposition to the practice seems to have been based on the alleged danger of the admission of air into the pleural cavity; and another argument was that the operation was unnecessary and of no value, as, according to the law of Louis, acute pleurisy with effusion is never the immediate cause of death. This law although founded only on 150 cases of simple pleurisy terminating in recovery, was adopted by many physicians, and was not refuted until the appearance of an essay by Dr. Lacaze du Thiers, who demonstrated, by a large array of cases, that it is possible to die, and to die suddenly, from acute pleuritic effusion. Although many cases were published showing that the admission of air into the pleural cavity during the operation did no harm, the practice did not gain many imitators in this country until the publication of the results of Dr. Bowditch, of Boston, U.S. That gentleman had long deplored the uselessness of the treatment which allowed effusions into the pleural cavity to remain for many months, and the dangers attending large effusions, but it was not until the invention of the excellent suction instruments of Dr. Wyman, in 1850, that he saw his way to any improvement in his practice. Since that time he has operated on 270 occasions, and although he has met with grave accidents, such as tapping the lung, driving air into the pleural cavity by a careless turn of the handle, &c., he has saved a great number of lives, and has every reason to be satisfied with his practice. The publication of his results has had a good effect in this country; and although there are still some who, basing their objections on theoretical grounds, do not follow his practice,—all, so far as I know, who have tried it, speak of it in terms of great praise. Still it may, I think, be asserted that paracentesis is not resorted to as frequently as it should be, and there are difficulties in deciding upon the proper cases for the operation. With a view of helping to clear away these difficulties, and of encouraging others to follow the practice, I am induced to bring forward the results of my own experience, and in so doing I shall merely give the general features of the cases from my note-book. The first case is one of simple acute pleurisy in a young woman aged

20, who had generally enjoyed good health until about a fortnight before she came under observation, when, after exposure to cold she had a fit of shivering, followed by pain in the left side, short dry cough, and inability to lie on her left side. She did not take to her bed, but in a few days she noticed that she had difficulty of breathing, and that she could not lie on her right side. When examined her pulse was 90, respirations 38 per minute. There was arching of left chest, displacement of heart, apex beat being near right nipple, dulness on percussion over left chest which extended to the right of mesial line, and no respiratory sounds heard on left side except in supraspinous region. In spite of diuretics and purgatives the effusion increased, and in three days more there was distinct dulness in the supraclavicular region and urgent dyspnœa.

Paracentesis of the chest was resolved upon, and by means of Bowditch's syringe 66 ounces of fluid were withdrawn. The fluid was rich in albumen, but presented no opacity. Considerable relief was experienced by the patient. The dulness diminished, bronchial breathing was heard over the left chest, in a few days friction sound returned and the vesicular murmur gradually became audible, and the patient convalesced rapidly. The treatment after the operation consisted in the continuance of the diuretic medicines, a morphia cough mixture, and a blister to the side. The success of this case was sufficiently encouraging, and gave me hope for the future.

The next case to which I shall refer is one in which the pleural effusion came on during a severe and protracted attack of enteric fever. This is a not unusual and sometimes alarming complication of that disease. The case is as follows:—Wm. L., aged 19, a labourer, was admitted into the Carlisle Fever Hospital Feb. 3rd, 1871. Patient had been ill for a week previous to admission, and presented all the usual symptoms of enteric fever complicated with considerable enlargement of liver and spleen. He continued to have diarrhœa, a rather high range of temperature, a good deal of restlessness and delirium, but no symptoms pointing to the chest until the 16th, when he is noted as having a short irritating cough but no expectoration, and an inability to lie on the right side. There is also considerable effusion into the cellular tissue of the legs, abdomen,

and scrotum; the hepatic enlargement continues. On the 18th there is general anasarca but no albuminuria; dulness on percussion over the whole of the right chest and distant respiratory murmur, and on the left side exaggerated respiratory sounds. Diuretics were freely given, and sinapisms and poultices applied. On the 20th the dulness on the right side of the chest is complete, but the hepatic dulness and general œdema diminished, dyspnœa beginning to be troublesome. On the 24th his condition was alarming. He was restless and excited and talking incessantly; pulse very feeble, breathing laboured, and absolute dulness over right chest extending to left edge of sternum. Paracentesis was resolved upon, and by the use of Bowditch's syringe forty-six ounces of clear straw-coloured fluid was withdrawn. The operation was suddenly suspended on account of the patient's extremely feeble pulse and tendency to fainting. The fluid on cooling formed a jelly-like mass, and a solid white coagulum on the application of heat. Shortly after the operation respiratory sounds were audible over the back of the right chest, and the intercostal spaces became visible to the eye. The patient's condition was certainly improved by the operation, and his breathing somewhat easier, although there was still evidence of a large amount of fluid in the pleural cavity. The febrile symptoms continued severe. There was a good deal of delirium, restlessness, and diarrhœa, but rather less general œdema. On March 1st the dulness over the right chest was almost absolute anteriorly, and again extended to the left edge of the sternum, there was also dulness posteriorly with distant tubular breathing along the spine. Paracentesis was again performed, and 56 oz. of serous fluid removed, but not quite so coagulable as on the last occasion. This operation was followed by a good deal of relief and the patient slept better, and felt a little stronger. Percussion posteriorly gave a tolerably clear note down to the level of the middle of the scapula. On the 4th the breathing was freer, and the area of clear percussion and natural respiratory sounds was increased. The diuretic was continued and the chest painted with iodine. The effusion, however, rapidly increased during the next two days, and on the 6th the right chest was found to be universally dull, the dulness reaching to the left edge of the sternum, and the breathing much distressed. He was again

tapped and 123 ounces of fluid removed. It was darker coloured than on the previous tapping and not so coagulable. A small quantity of air entered the chest during the operation. Great relief followed and the patient expressed himself as feeling better and easier, and able to sleep well. On the following day the right chest was quite clear anteriorly, and normal vesicular murmur audible. Posteriorly there was clear percussion note as low as one inch below angle of scapula, and respiratory murmur feeble but natural. From this date he continued to improve. There was occasional slight effusion, but by the continual exhibition of diuretics (iron and digitalis) and the external application of iodine, its absorption was promoted. On the 20th the anterior chest resonance was clear and normal, but still slight dulness at base posteriorly. Although he continued for several weeks longer in the hospital, suffering from occasional exacerbations of fever, there is nothing further noteworthy in this case as regards the condition of the chest. In this case the effusion was very insidious in its onset, and rapidly assumed alarming proportions. The operation on each occasion gave great relief, and on the last occasion when upwards of 6 pints were removed, the effect was marked and the chest complication ceased to cause anxiety.

The next case also occurred in the Carlisle Fever Hospital. R. L., aged 43, a gamekeeper, was admitted Aug. 21, 1872. Patient had been ill since the 12th, and among the ordinary symptoms of an attack of enteric fever he had frequent pains in the chest, but no chest complication was noted on admission. The fever was of a rather severe type, and ran its usual course. No symptoms occurred pointing to the chest, but it happened on the 5th of September, in examining his chest, that I found dulness over the left side of the chest, tubular breathing, and ægophonic resonance. On the 6th he began to complain of cough and shortness of breathing. On the 9th dulness was found extending as far as the right side of the sternum and displacing the heart, the apex beat being 4th right interostal space, but the dyspnœa not urgent. Diuretics were freely given, and seemed to have the effect of slightly diminishing the amount of the effusion; but as the symptoms of fever subsided, it was found that a large amount of effusion still remained, and on the

23rd the dulness is noted as extending as far as the right edge of the sternum.

On the 30th there was modified percussion resonance over the left infraclavicular region, extending as far as the lower border of the second rib. During the month of October the febrile condition subsided, but there was little variation in the amount of chest effusion, and on the 25th of October it was noted that there was absolute dulness over the left chest both anteriorly and posteriorly, except in the supraspinous region, and the heart was pushed over to the right side. The diuretic remedies seemed to be acting freely, the amount of urine passed daily ranging from $4\frac{1}{2}$ to $5\frac{1}{2}$ pints; but at the end of the month, as blisters, the application of iodine to the chest, and the free administration of diuretics failed to do the amount of good expected, it was resolved on the 30th to resort to paracentesis, and 50 oz. of greenish yellow fluid were pumped out by means of Bowditch's syringe. The fluid was albuminous, and became solid on the application of heat. There was, however, a rapid re-accumulation, and the chest was again tapped on the 15th November, 47 ounces of fluid being removed. On the 26th it was noted that respiratory sounds were heard over the front of the left chest and over the upper two-thirds of it posteriorly. Measurement showed that the left was 2 inches less than the right side. Shortly after this the patient left the hospital and returned to his home in the country. He continued in delicate health, and did not gather strength sufficient to enable him to follow his work. Five months afterwards, while driving past his house I was called in to see him. I found that there was evidence of reaccumulation of fluid in the pleural cavity, and, taking with me the necessary instruments, on the following day I performed paracentesis, and withdrew 90 ounces of turbid serous fluid. After this, to use the patient's own expression, he never looked behind him, and rapidly got quite well.

At the present time, May 8, 1875, he states that his general health is good, that he works daily in the woods, felling trees, and that only after hard exertion he suffers from slight difficulty of breathing. There is only half an inch difference in the measurements of the two sides, the left being half an inch smaller than the right. The apex beat is almost in its normal position. There is slightly impaired resonance at the back of the

left lung, but the normal vesicular murmur is heard fairly well all over the left chest, but more clearly at the apex than the base. The expansion of the chest walls is almost equal on each side. He never suffers from any cough, and feels himself able to do a tolerably fair day's work.

In this case I think the operation might have been performed with advantage at an earlier period. I was induced, however, to give a fair trial to the action of drugs; and, as the diuretics seemed to be acting freely, and the chest symptoms not causing anxiety, the operation was delayed. This is in accordance with the practice of Bowditch, who allows three or four weeks if the effusion is not very great, the dyspnœa not urgent, and the remedies seem to be having a beneficial effect. The objection to this course seems to me to be that it allows of the formation of adhesions binding down the lung and displaced heart.

In the following case the effusion was of a chronic character, and had probably existed for some months. The case is as follows: J. M. aged 20, admitted into the Cumberland Infirmary March 18, 1874. Patient states that he always enjoyed good health until twelve months ago, when he caught a severe cold, accompanied by slight cough and pain in right side. He was engaged at that time in a large house of business in London, but becoming unfitted for work by reason of his illness, he returned home to his friends in the country. Since then he has been delicate and has lost flesh considerably. The pain in the right side has been nearly always present, but the cough only occasional, and never severe. Has been repeatedly blistered and taken a variety of medicines; has suffered from difficulty of breathing on the least exertion, and a few days ago he had an alarming attack of dyspnœa, which led to his application for admission. On examining his chest it was at once seen that there was considerable arching of the right side, the intercostal spaces being obliterated and the measurement showing 17¾ inches on the right side, and 16 on the left. There was absolute dulness on percussion over the whole of the right chest, and the respiratory sounds were feeble and distant, bronchial breathing and bronchophony being heard over a limited area of the apex posteriorly. The heart was displaced slightly to the left, the apex beat being in the nipple line. There was also a loud systolic bruit, heard loudest at the apex.

The dyspnœa was considerable, and he was unable to lie on his left side. There were no other abnormal symptoms of moment present. On March the 20th, owing to the considerable urgency of the symptoms, it was deemed desirable to perform thoracentesis, and by means of the pneumatic aspirator 25 ounces of turbid serous fluid was withdrawn. The operation was then suspended on account of some blocking of the needle-trocar. The relief experienced by the patient was great, and he was able, immediately afterwards, to lie on his left side. His chest was freely painted with iodine, and diuretic medicines, previously ordered, were continued in increased quantity. In spite of this, however, there was a rapid re-accumulation of fluid, and on April 9, it was so extensive that the apex beat of the heart was two inches to the left of a perpendicular line drawn through the nipple. The aspirator was again used and 104¼ ounces of fluid withdrawn. Notwithstanding the continued exhibition of nearly all diuretic remedies in succession, and the repeated blistering of the chest with iodine and and liq. epispasticus, the fluid again and again accumulated, and between April 24, and July 25, inclusive, paracentesis was performed twelve times, the amount of fluid removed varying between 90 ounces on the former date and 7½ on the latter. After each operation the heart returned to its normal position, and as soon as its apex beat was felt to the left of the nipple line the operation was repeated. From a week to a fortnight elapsed between each aspiration. During the earlier part of July the chest continued to improve, the dulness became less and less, a friction sound appeared, and more natural respiratory sounds were audible over right lung. The cardiac bruit also disappeared. He was discharged quite well on August 5, but he presented himself again for examination on the 17th November, when the following note was taken. The heart is in its normal position. There is no bruit. The resonance over the chest is everywhere good, except at right base where it is still slightly impaired, and natural respiratory sounds are heard fairly well all over, except at base where they are still feeble. He never suffers from any chest symptoms, and has to-day just returned from a thirty miles run with the beagles, and feels no worse for his exertions.

July 10, 1875. Has been in London during the last seven months, and has continued quite well, and never experienced

any difficulty of breathing or suffered from any chest symptom. The physical signs are the same as at last report. This case illustrates very well a fact pointed out long ago by Sir Thomas Watson, namely, that when a serous membrane has long been stretched by its contents its natural absorbing power is diminished; and it is probably due to this cause that the cure was so protracted and so many tappings rendered necessary.

In the foregoing cases the fluid removed was always of a serous character, but when from delay or natural debility of constitution the fluid becomes purulent, the results from the operation are sometimes not less satisfactory, as the following case will show. On the 9th Sept. 1874, I was asked by Dr. Maclaren to see in consultation with him, a young lady whom he was attending for Dr. Lockie, during that gentleman's absence on his holidays. She was 19 years of age, and had been ill for six weeks, but had only returned home a few days before she was seen. She had caught cold after bathing, and had suffered from frequent and very distressing cough, pain in the chest, great restlessness and delirium. She was much exhausted, very feeble, had almost constant cough and profuse perspirations. A month previously she is stated to have had two attacks of shivering. On examining her chest it was found that there was complete dulness and almost entire absence of breath sounds over the left chest, except under the clavicle, where there was skodaic resonance, and some tubular breathing audible. The cardiac impulse was felt an inch to the right of the lower part of the sternum. The left chest measured above the mamma 16½, and the right chest 15 inches. She was very delirious and restless, and much exhausted with cough, difficulty of breathing, and pain in her chest. The morning and evening temperature only registered 100° F. I quite concurred with Dr. Maclaren in the propriety of operating immediately for her relief. The results of the physical examination pointed to the presence of a large collection of fluid in the pleural cavity, and although doubtful of its character, the necessity for immediate interference was obvious. Paracentesis was at once performed, and by the use of Dieulafoy's aspirator 60 ounces of perfectly inodourous pus were withdrawn. The pulse improved in character during the operation and the patient fell asleep before it was concluded. By the use of iron

tonics, a liberal diet and port wine, the general condition somewhat improved, and when I saw her again on the 14th she was decidedly stronger, and had slept better. There was evidence of re-accumulation of fluid. The line of absolute dulness posteriorly reached as high as the middle of scapula, and as high as the 4th rib anteriorly. The cardiac apex impulse was on the right of the sternum. Paracentesis was again performed and 27 ounces of pus withdrawn. Towards the latter part of the operation a small quantity of blood escaped. I saw her again on the 21st. She was still restless, did not sleep well, and complained of a good deal of pain in her left side. The heart sounds were heard loudest behind the ensiform cartilege. There was clear percussion note over left front of chest, but feeble respiratory sound; posteriorly dulness reached as high as the angle of scapula. The aspirator was used for the third time, and 19 ounces of pus stained with blood, withdrawn. The blood was equally mixed with the pus rendering it of a deep red colour, and was probably effused at the last operation. The relief experienced was considerable. The breath sounds became clearer, and the dulness on percussion less marked. There was considerable contraction of left chest, and it measured $1\frac{1}{4}$ inches less than the right. On the 28th a fourth and last operation was performed, and about 8 ounces of fluid removed, about one-third of which appeared to be blood and the remainder pus. On account of the patient's extreme sensitiveness and fear of pain, this operation was performed while she was under the influence of chloroform.

From this date she steadily improved. Under the continued use of tonics, a liberal diet, and careful nursing, she gradually gathered strength, and the chest symptoms gave no further trouble. Dr. Lockie has kindly furnished me with a note of her condition on April 19, 1875. It is as follows: "General health good. Girth of chest, $30\frac{3}{8}$; right, $15\frac{5}{8}$; left, $14\frac{6}{8}$. Expansion very considerable; left shoulder slightly lowered; slight flattening in left infraclavicular, supramammary, inferior lateral and posterior regions; slight comparative dulness on percussion in these situations; slightly interrupted respiratory murmur in left infraclavicular region; respiratory murmur in other situations a little more feeble than on right side."

Such a favourable result as the physical signs show have

taken place in this case—viz., adhesion of the opposing pleural surfaces—was hardly anticipated at one time, and could scarcely have been obtained so quickly from any other plan of treatment. It is laid down by many writers that in a young and previously healthy subject, when a first tapping has shown the presence of pus, and there is a tendency to reaccumulation, a permanent opening should be made without delay. When this is done the treatment is often protracted for many months. In the foregoing case the patient was approaching convalescence in less than a month, and hence the desirability of giving paracentesis a fair trial in similar cases.

In addition to the foregoing cases there are other conditions, in some of which I have seen paracentesis practised with advantage, and in which it has been practised by many physicians of high standing. It will be sufficient if I simply indicate these conditions, without referring more particularly to them.

In the passive effusion into the pleural cavity, which occurs sometimes in cases of heart disease or in post-scarlatinal dropsy, the operation is sometimes performed with great benefit. It is also recommended in cases of pleural hydatids, hæmothorax, hydropneumothorax, and as a palliative in cancerous pleurisy and empyema occurring in connection with phthisis pulmonalis. Bowditch recommends its use in pneumothorax, and a remarkably successful case of traumatic pneumothorax treated in this way occurred some time ago in the Cumberland Infirmary under the care of my colleague, Mr. Herbert Page. The patient was thrown from a cart, and from the in-driving of a fractured rib got pneumothorax with total collapse of right lung. The symptoms were urgent, and paracentesis by means of Dieulefoy's aspirator was performed four hours after the accident. A large quantity of air and some blood was withdrawn. Immediate improvement in the condition of the patient followed, and although three subsequent aspirations were rendered necessary, the patient ultimately got quite well.

Although there are many objections which have been urged against paracentesis of the chest, there are few which carry much weight. The fear of fatal syncope during the operation from the prop to the heart, which the accumulated fluid forms, being too suddenly withdrawn, or from hæmorrhage resulting

from wounding of the viscera, is now quite unnecessary. With modern instruments the fluid can be withdrawn very gradually and with the aids to the physical examination of the chest which we now possess there must be absolute certainty of the exact position of the viscera before proceeding to operate, and any danger of wounding them is removed. In the cases which I have quoted the operation has been performed twenty-nine times, and in no case did any bad result follow. On one occasion there seemed to be a tendency to faint during the operation, and the proceedings had suddenly to be suspended. This, however, I think was clearly due to the extremely feeble condition of the patient. Fatal syncope is one of the usual forms of death in acute pleurisy, and is much more likely to arise from keeping the fluid in the chest than from letting it out. Of 820 cases collected by Evans, in only two did death follow the operation. Another objection which is commonly urged is the risk of the admission of air into the pleural cavity, and thus converting a serous into a purulent effusion. By the use of Bowditch's syringe or Dieulafoy's aspirator this accident need not occur except through carelessness, or from pure accident. In a great majority of cases in which it does occur it does no harm. Numbers of cases of pneumothorax do well, and if the accidental admission of air should occur, it need not cause much anxiety. What is of more importance, and deserves more attention, is the fact that in some cases albuminous expectoration quickly follows the operation, and may cause alarming symptoms and even death. When the amount expectorated is only small the symptoms are mild, but if it be excessive it leads to distressing dyspnœa, spasmodic cough, and death by asphyxia resulting from the accumulation of the fluid in the bronchial tubes. The symptoms come on in from ten minutes to an hour after the operation. Pinault first pointed out the occurrence of this albuminous expectoration after thoracentesis, and it has led to much discussion among French physicians. Among the causes which have been assigned for it may be mentioned perforation of the lung by the trocar, spontaneous perforation, and pulmonary congestion giving rise to transudation through the alveolar walls. Dr. George Johnson attributes it to absolute blood-stasis in the minute pulmonary vessels, especially in the

pulmonary veins. It is impossible in the present state of our knowledge to decide which of these views is the correct one, and it is essential that further careful observations should be made on every case of the kind that occurs. A fatal case is reported by Dr. Ernest Legendre in a recent number of the *Gazette des Hopitaux*. About three litres of pink turbid fluid had been withdrawn by means of Dieulafoy's aspirator, and the patient experienced marked relief, but in a very short time the dyspnœa returned; there was a copious outpouring of the secretion into the air-passages; cyanosis, and death from asphyxia in about five minutes. Until the exact pathology of such like cases is more clearly understood, it will be impossible to guard against their occurrence, and in the meantime it will be sufficient to remember that alarming symptoms and even death may follow the operation, but as this is an extremely rare accident, it need be no bar to it in suitable cases.

A few words may be said in regard to the operation itself, and before doing so I would beg to express my obligations to my friend and colleague, Dr. Maclaren, for the able assistance he has rendered me in operating for me on most of the cases which I have recorded in this paper. The instruments used have been either the syringe and trocar of Wyman as used by Bowditch, or the pneumatic aspirator of Dieulafoy I prefer the latter instrument, and use the form figured in the accompanying drawing (Fig. 1). It would, however, conduce to the greater economy of time without interfering with the efficiency or success of the operation if the vacuum bottle (A) were of a larger size than the one generally supplied.

The precise place in the chest-wall at which the puncture is to be made has been the subject of much difference of opinion; and while some authorities recommend the fifth or sixth interspace, others say the space between the ninth and tenth ribs is the best. It is a good rule, when the effusion is limited to one side, not to tap anywhere unless it is absolutely and unmistakably dull on percussion, and an inch and a half or two inches higher than the lowest point at which the respiratory murmur is heard on the opposite side. I recommend the puncture to be made in a line let fall from the lower angle of the scapula. Previous to commencing the operation a careful examination of the chest should be made, and notes of the physical signs taken.

The vacuum bottle (A) should then be thoroughly exhausted by means of the syringe (D). Taking hold of the needle-trocar (E) in the right hand and pushing in the intercostal space at the place selected for the puncture with the top of the forefinger of

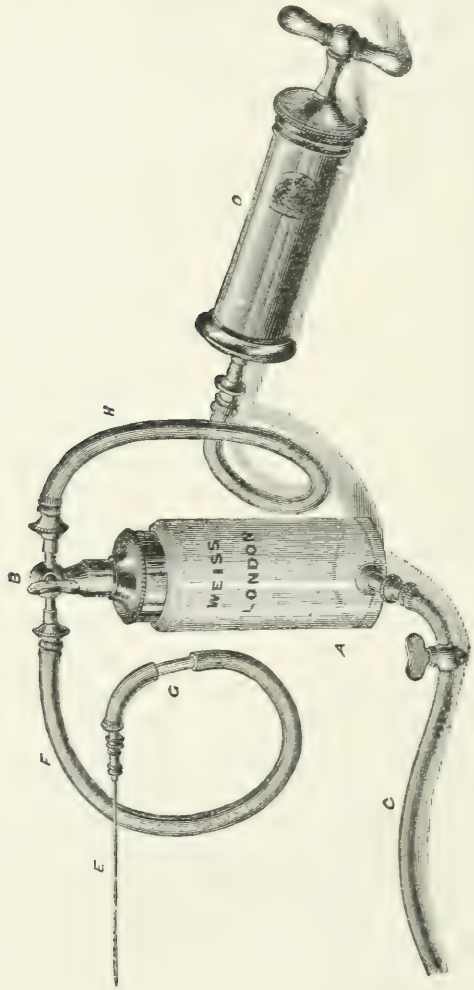

Fig. 1.

the left hand, the needle-trocar is plunged in at the depressed part slowly through the skin and superficial fascia, and then quickly so as to penetrate and not push forward any false mem-

brane that may be adhering to the parietal pleura. As soon as the trocar is well through the chest-wall, the tap (B) is turned and the fluid will then be seen passing along the tube (G, F) into the bottle (A). If no fluid appears, the needle-trocar may be gently pushed forward; and if still unsuccessful it is better to take it out and introduce it afresh. When the bottle (A) is full, the tap (B) should first be turned, the tube (E) disconnected with the syringe, and the bottle emptied through the tube (C). As soon as this is done the bottle must be thoroughly exhausted before the tap (B) is again turned, and this process will have to be repeated several times before the chest is emptied of its fluid. When a sufficient quantity has been drawn off, the trocar is taken out, and no further dressing is necessary for the puncture than a piece of dry lint and plaster or lint soaked in collodion. Sometimes during the operation the patient suffers greatly from pain. This arises from the expansion of the lung and the entrance of air into bronchial tubes long unaccustomed to its presence. Towards the end of the operation it is not unusual for blood to flow, but this need give rise to no anxiety. It arises from rupture of some small vessels in the false membrane or on the inflamed pleura, and is readily absorbed. If the patient show any tendency to faintness, or if the pain and dyspnœa become very urgent, the operation should be at once suspended, otherwise as much fluid should be removed at each tapping as will flow, and the chest as thoroughly emptied as possible. The after-treatment which I consider most useful will be gathered from a perusal of the cases in the earlier part of the present paper.

In regard to the precise time for operating a few words may be said, and I think a simple rule may here be laid down. When the dyspnœa is urgent, or when the effusion does not seem to be diminishing under the influence of ordinary remedies, the sooner paracentesis is performed the better. More than 200 years ago Goulu pointed out that paracentesis of the chest in hydrothorax was safer and more frequently successful than paracentesis of the abdomen, and modern experience confirms that view. Neither age, sex, the existence of pregnancy, nor any other complication need be a bar to the operation; and if the effusion by its presence is causing distress to a patient already very ill, the indication is to operate without delay.

TREATMENT OF CALCULOUS DISEASE OF THE KIDNEYS.

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I WISH to make a few remarks on those able and interesting articles which recently appeared in the *Practitioner* on Calculous Disease of the Kidneys, by Dr. Basham, Westminster Hospital.

Circumstances have given me more than ordinary interest in the treatment of so-called "renal colic," aside from the fact that the treatment of a complaint so painful and exhausting to the patient should receive the most careful attention of every practitioner. Any plan of treatment that aims to cut short the patient's suffering, and to lessen the risk of impaction in renal colic, should command the interest of every physician. Such is the object of these remarks, and must be my apology for venturing to occupy valuable space in the *Practitioner*, and for presuming to criticise the treatment advised by the senior physician to Westminster Hospital.

During a partnership of over four years with a gentleman of this city (who is himself a man of remarkable professional instinct and ability), he passed hundreds of renal calculi. Most of them, it is true, were small, but a few were large, and their passage caused the most excruciating pain; one stone in particular, its passage from the kidney to the bladder having occupied ten days, caused the most fearful suffering and extreme exhaustion: in fact, our patient had for twenty-four hours all the symptoms of impending dissolution.

During these four years we read, and continue to read, every-

thing procurable on the subject of "Calculous Disease of the Kidneys." I may say that this gentleman has tried various plans of treatment to prevent the formation of gravel, but with little or no success, as he is still manufacturing stones, having voided over seven hundred and fifty in one day a few weeks since. They had probably been several days accumulating in the bladder. The treatment employed by this gentleman in his own first few severe attacks, and also in those of other patients at that time, was exactly that recommended by Dr. Basham in the articles to which we referred. In fact, it was what all good authorities advised. We thought, like Dr. Basham, that "the most effective treatment is the hot bath, aided by anodynes. The combined effect of moist heat and opium relaxes the spasm of the duct, and relief is safely obtained. . . . It is very rare to witness a case in which the paroxysmal colic is not speedily relieved by opium and the hot bath. The temperature of the bath should be maintained at as high a degree as the patient can bear; the more profuse the perspiration induced, the more speedy will be the relief." (*Practitioner*, Jan. 1875, p. 30.)

I have no hesitation in saying that this treatment advised by authors is at variance with our experience, as well as opposed to common sense and sound reasoning. It implies that it is by relaxation of the ureter that the calculus passes. And here is the mistake; it is no such thing. The calculi are driven through the ureter by the accumulation of urine behind them. The urine furnishes the *vis a tergo* without which no possible relaxation of the ureter will allow a calculus of any considerable size to roll through it.

It is true that the very hot bath, the profuse perspiration, and the opium, relieve "the paroxysmal colic;" but if the impacted stone is large it is a dangerous relief—it is bought too dear. The opium benumbs the sensibility of the patient, the profuse perspiration checks the excretion of the urine, destroys for a time its *vis a tergo*, and the patient is lulled for the moment; and because the stone is not being forced onward. Thus is the patient subjected to the risks of ulceration from impaction, and perhaps death from exhaustion or perforation. As we have no means of measuring the size of the stone when called to treat a case of renal colic, our treatment should

not be to prolong its passage. And this is exactly what we do with the hot bath and profuse perspiration, and what caused the calculus in my partner's case to be ten days passing. A few days since I was called to see a Mr. Barton, who was thought to be dying. I found him in bed in great agony, bathed in perspiration, intense pain in the side, shooting down the track of the ureter to the bladder and testicle, with severe pain in the head of the penis.

Immediately recognising that the *lapis infernalis* had started on its journey, I gave one grain of morphine subcutaneously; ordered him to get up and dress in his wrapper, and walk the floor. Had prepared for him a pitcher of flax-seed tea, with cream of tartar, ice cold, and ordered him to walk and drink and drink and walk, and to rub his side downwards along the line of the ureter, with orders to use a suppository—Morph. sulph. gr. ss., ext. hyoscy. gr. v. ol. theobrom. q. s.—every second hour while the pain continued. In two hours we had the gratification of seeing a good-sized stone. I made him walk because one can endure pain better while walking than when lying in bed, also to get the advantage of gravitation, and that the jar of walking might assist the descent of the stone; the flax-seed tea with cream of tartar ice cold, to cause diuresis and supply the *vis a tergo;* the morphia to enable him to endure the pain of the dilatation of the ureter, the pressure of the urine, and the passage of the stone. This I claim is the rational treatment for renal colic.

Reviews.

Croup in its Relations to Tracheotomy. By J. Solis Cohen, M.D. Philadelphia: Lindsay and Blakiston, 1874. London: Trübner and Co., Ludgate Hill.

This essay, which extends over seventy-eight closely-printed pages, was read before the Philadelphia County Medical Society, where it was so well received that Dr. Cohen was requested to publish it. We readily endorse this recognition of its merits; but it seems necessary at the outset to say a word or two as to the object which its author has had in view; for it can scarcely be gathered from the title which he has chosen. And, shortly, this has been in the first place to examine the value of tracheotomy in croup and diphtheria, and, secondly, to discuss the best method of performing the operation in children, and of meeting the various difficulties and complications that may arise during its performance or in the after course of the case. The subject is thus treated almost entirely from a surgical point of view, and the author has secured himself an open field by defining croup as "an exudative inflammation of the air-passages," including under this head both "sthenic croup, or croup proper, and systemic croup, or the croup of diphtheria." Dr. Cohen has expended much labour on the production of his brochure, and has added to his own views exhaustive references to the works of English and Continental authorities, and also a large collection of statistics of tracheotomy in the hands of those by whom it has been most often practised, so that the essay forms the most complete repository of information on the subject that we have yet seen. Twenty-six pages are devoted mainly to statistical tables, which bring out in a strong light the great diversity of results that have been obtained by different operators, but leave no room for doubt that, on the whole, the operation is the means of saving a large number of lives. There is a carefully written chapter on the indications for the operation, and another on the chief points of importance to be observed during its performance. Dr. Cohen wisely insists on the necessity for

deliberation, and introduces the following extract from a speech by Professor Trousseau :—"A certain surgeon has reproached me with operating like a physician, and not like a surgeon. Well, he had an opportunity on one occasion of operating like a surgeon, and with one stroke of the knife he divided the œsophagus as well as the trachea. Some time afterwards he lost another patient by hæmorrhage during his brilliant operation. Since then Mr. —— has operated more like a physician, and after a while he will become a very fair tracheotomist." The lesson conveyed in this trenchant satire of the veteran French physician is one that we commend to all who have not had large experience in the performance of tracheotomy in children. Those who have will have learnt it for themselves. Much valuable clinical information will be found in the sections devoted to the after-treatment of the disease and of the surgical wound, and to the casualties which prevent recovery. Dr. Cohen concludes with a summary of the doctrines he has advocated, and these show how thoroughly he has performed his task.

The Pathological Anatomy of the Nervous Centres. By Edward Long Fox, M.D., &c. London: Smith, Elder and Co. 1874.

The object of this work, as the author states, is to present in a convenient form the valuable material in reference to nervous diseases which is to be found scattered in various publications at home and abroad, while at the same time he makes valuable contributions from his long experience in the Bristol Infirmary.

Dr. Fox shows himself well acquainted with the literature of his subject. He carefully analyzes it, and describes well and excellently illustrates the various morbid conditions to be found in the nerve centres. The first part of the work is devoted to the consideration of the abnormalities and diseased processes to be found in the nerve centres; the second deals with the pathology of special diseases. In the latter half Dr. Fox more particularly expresses his own views as to the physiological pathology of the symptoms manifested. Many of his observations are worthy of notice, but we think he too often manifests a tendency to satisfy himself with some vague condition of the blood or blood-vessels in order to account for the morbid manifestations.

Thus in speaking of delirium tremens, he thus seeks to account for the characteristic tremors:—"It must probably be from the malign influence of, or the negative fact of, mal-nutrition by the carbonaceous blood of the motor centres, either some of the external cerebral convolutions, or some large organs at the lower part of the brain, or the great cells of the grey matter of the spinal cord," p. 174. We think that such a loose method of

writing is not much calculated to give precision to our knowledge of the subject.

Again, in seeking to account for the efficient cause of epilepsy he falls back on his humoralist theory, and attributes it to "a limitation of the blood supply to some portion of the encephalon, or to an abnormality in the blood itself, and of all abnormalities the most important is the diminution of oxygen," p. 324.

In reference to the pathology of tetanus, after considering the views advanced concerning it, he says: "I believe that in tetanus we must look for the connective lesion in the chemistry of the blood. In strychnia poisoning, a disease so closely analogous to tetanus, the presence of strychnia in the blood, or rather the effect strychnia has on the physiological condition of the blood, has been demonstrated as the cause of the spasmodic phenomena," p. 361. We think that if Dr. Fox had been acquainted with Lewisson's experiments on bloodless frogs he would not have considered the nature of strychnia poisoning so definitely demonstrated; for, as this experimenter has shown, frogs whose blood vessels have been emptied of blood and filled with salt solution, still exhibit all the characteristic phenomena of strychnia poisoning when it is introduced into their system.

We mention these as examples of the too great readiness with which our author satisfies himself with very questionable theories which serve rather to obscure than elucidate the subject.

The Surgeon's Pocket-book; being an Essay on the Best Treatment of the Wounded in War. By SURGEON-MAJOR J. H. PORTER, Assistant Professor of Military Surgery, Army Medical School, Netley.

THIS essay obtained the prize offered by Her Majesty the Empress of Germany in 1874, and is "specially adapted for the public medical services." One thing that certainly specially adapts it is its small size and convenient form, being really a book that can be carried in the pocket. Medical officers of the public services, but particularly of the army, are apt to be moved about so constantly that their libraries must of necessity be small and compact; and one of the disadvantages they suffer from is the difficulty, or in most cases, impossibility of obtaining the most recent and valuable medical knowledge in a concise form. Reynolds's *System of Medicine*, and Holmes's *Surgery* contain papers on different subjects of great interest and importance, but the bulk of the volumes makes it almost impossible for medical officers to carry them about, especially on foreign service, where the quantity of baggage is obliged to be very limited.

The first part is devoted to a consideration of the points to be

attended to in the conveyance of men wounded in action. This will prove especially serviceable to young medical officers who enter on a campaign for the first time. Many hints are given which, in the hurry and bustle of an engagement, might not be thought of, but which might make all the difference to a wounded man, whether he was jolted along in agony or carried with the minimum amount of suffering. Instructions for utilizing rifles, sword-scabbards, great coats, tunics, belts, and even knapsacks are given; occasion for using which articles in this way never arises except on active service.

The best way of putting up fractures with limited appliances, and the principles of treating the different kind of gunshot and other wounds are dealt with. Then the wounds of different regions of the body—their various complications; injuries of joints, noting those adapted for resection and those in which amputation must be resorted to. Much knowledge on these matters has been gained by the last Franco-Prussian war. Hospital gangrene, osteo-myelitis, and other diseases which often occur among a mass of wounded men, are treated of; the best way of cooking in the field, of making temporary latrines, and of filtering water. A classification of wounds, and the formulary of prescriptions in general use in military hospitals conclude the work. It is just such a little work that has long been wanted, in which men placed in a novel position can find out quickly what is best to be done, and we strongly recommend it to every officer in the public medical services. The illustrations are numerous, and well executed; and its moderate price places it within the reach of all.

The Treatment of Skin Diseases. By R. Liveing, M.D. Third edition, 16mo. pp. 116. London: Longmans and Co.

This little book is, as it professes to be, devoted chiefly to treatment which is clearly described, and is brought up to the knowledge of the present day. It does not pretend to discuss fully debatable points in dermatology, but some interesting remarks will be found under the following heads—erythema, pityriasis, miliaria, psoriasis, and tinea decalvans.

The author points out that there are two varieties of lepra or psoriasis, the one occurring chiefly in scrofulous families, and generally appearing at an early age or about puberty; this form does not itch, and is especially relieved by cod liver oil, arsenic, and change of air. The other variety occurs commonly at a later period of life, and especially in gouty families: it is attended with itching, and is closely allied to the dry forms of eczema, from which it differs chiefly in the fact that there is no true exudation; and the disease attacks commonly the

extensor side of the elbow and skin below the knee, which are the characteristic situations for psoriasis and not eczema. It is this form of psoriasis which is often cured by iodide of potassium and colchicum. The writer regards alopecia areata and tinea decalvans as identical diseases, and not in any way dependent upon vegetable parasites, and he fully explains how the error of inventing an imaginary disease (tinea decalvans) has arisen (p. 73). In the treatment of common ringworm he recommends Goa powder as a remedy of great value when thoroughly applied. He agrees with Dr. Hilton Fagge in regarding the pityriasis rubra of Hebra as a severe and rare form of dry eczema, or at all events as very closely related to that disease; and he recommends phosphorus as sometimes useful in its treatment. The book is especially adapted for the practitioner who, already versed in the diagnosis of skin diseases, desires a clear and concise description of their treatment.

On Alcohol. A Course of Six Cantor Lectures delivered before the Society of Arts. By B. W. Richardson, M.A., M.D., F.R.S. 8vo. pp. 122. London: Macmillan and Co.

In these lectures Dr. Richardson gives an excellent account of the physiological action of alcohol and substances allied to it, and describes the differences in the physiological action between alcohols belonging to the same homologous series. Although delivered to a popular audience, these lectures contain much instruction to medical men and even to those who have made the action of alcohol a special study. In regard to one point, however, Dr. Richardson's desire to impress the main points of his argument leads him to make a statement which if correct would be a serious argument against the use of alcohol in disease. —"Alcohol cannot by any ingenuity of excuse for it be classified amongst the foods of man. It neither supplies matter for construction nor heat. On the contrary it injures construction and reduces temperature." As Dr. Richardson has given an excellent account of Dr. Anstie's researches, and has also mentioned in the sentences which precede this quotation the probability that alcohol undergoes at first a partial oxidation, and then a further one, he evidently does not mean the statement that alcohol does not supply matter for heat to be absolute. It is well however, for the medical man to remember that alcohol in disease may have a double use, and that it not only retards the oxidation of the tissues, and thus tends to preserve them, but also may to some extent be itself oxidised instead of them, and thus act as a food. For the way in which it acts upon the temperature through the circulation we must refer our readers to these lectures, which will amply repay perusal.

Clinic of the Month.

Treatment of Chronic Dysentery.—Dr. Handfield Jones gives the details of two cases of chronic dysentery, in the first of which, occurring in a soldier, J. P., aged 24, who had been in India, red gum was ordered to be administered in the dose of 10 grains in a drachm of glycerine and an ounce of water, three times a day. The results were, apparently, most satisfactory, and the patient was sent out in a month, cured. Two months afterwards he was re-admitted with a relapse. The red gum was ordered again, and quite failed. Lead enemata and lead internally had no better effect. He continued to get worse. Ipecacuanha in doses of 5 grains combined with half a grain of opium produced slight improvement, but this only lasted for a time, and he died in about a fortnight. In the second case, J. K., the patient was 32 years of age, and had also been in India and Africa. The symptoms were well marked. He was ordered simple diet, rice pudding, beef jelly, and the same quantity of red gum and glycerine as in the previous case. No good results followed, though the quantity of red gum was increased to 15 grains for the dose. Turpentine stupes were applied, but after a fortnight, as the patient was no better, injections containing 6 grains of nitrate of silver, and 10 minims of the tincture of opium to 4 ounces of distilled water were ordered. No marked improvement followed, and 5 grains of ipecacuanha were given, and he became decidedly better. A month after his admission a drachm of the liquid extract of ergot was administered in an ounce of water three times a day. On the following day only two stools occurred, and on the next only one, and this continued till his discharge. In discussing these cases, Dr. Handfield Jones remarks that it is always satisfactory when we can comprehend the action of our remedies in a case of disease, especially when that disease is a representative one. Now, dysentery evidently represents, in great measure, the large family of catarrhs although there is also something specific about it, and it is prone to become a good deal more than a catarrh. Its chief peculiarity seems to lie in its tendency to affect the "substratum" of the

mucous membrane, that layer of nuclei and granular matter underlying the basement membrane of the surface, to which the solitary glands belong, and to which special attention was drawn by Dr. Handfield Jones many years ago in the *London Medical Gazette*. This constituent of the mucous membrane is apt to become infiltrated with exudation, while the basement membrane and epithelium perish. The causes of dysentery seem to be such as impair or annul the special endowments of arteries and capillaries. Malaria, foul air, excessive heat alternating with chilling cold to the cutaneous surface, are all very capable of producing these effects. One great feature in the dysenteric state, indeed the principal in all but the earliest stages, is the loss of the proper action of the blood-vessels. The arteries are relaxed, or very prone to become so, and the capillaries leaky; and as long as this condition persists, the symptoms, even if they subside for a time, are reproduced by the least provocation. To amend this defect, astringents to restore retentive power to the capillaries, and tonics to promote contractility in the arteries, seem rational remedies. But for their success it is requisite that they shall be of such a kind, and given in such doses, that they do not become irritants. This is a very important limitation of their use, and for want of due regard to it an otherwise suitable therapy may quite fail. In one case, 4 grains of tannin, and opii. gr. ¼ quater die, aggravated the dysentery a good deal, but ℥ss. of tincture of aspastic bark ter die, which contains tannin in some peculiar form, quickly cured it. Enemata of nitrate of silver are praised by Trousseau, but they made J. P. worse; so did turpentine stupes, which so often relieve a bronchial catarrh. The different success of red gum in the two cases is noteworthy. In J. K. it was markedly beneficial; the patient would in all probability have thoroughly recovered if he had been kept sufficiently long on the same treatment, and protected from the inclement weather, this too in spite of the existing abscess in the liver. At the time of his second admission he was too far gone to be rallied by any remedies. In J. P. red gum was useless, while ergot was speedily effectual. This seems to imply that the arterioles may be more at fault in some instances, and the capillaries in others. Dr. H. Jones is not aware whether ergot has been much used in the tropics, but it seems a hopeful remedy, and has been found successful by M. Luton, of Rheims (vide *Gaz. Hebdom.* Oct. 1871). He says, not only the hæmorrhagic element of dysentery, but the griping colic and fever, were at once relieved. He has tried ergot in some cases of inflammatory lung affection, but not with as much success as he expected. It is more decidedly useful in hæmorrhage. The good effect of the ipecacuanha during the exacerbation of the chronic disorder in the second case is

well marked. This remedy should always be resorted to on such occasions. It acts, he believes, as a tissue sedative, and takes off that irritability of the bowel which makes it intolerant of astringents and tonics. (*Medical Times and Gazette*, June 19, 1875).

Bilateral Irritation of the Pneumogastric Nerves in Man.—An experiment, so nearly attended with serious consequences that it is scarcely likely to be repeated, was tried in April last, by Dr. Thanhoffer, of Budapest, and consisted in the simultaneous compression of both pneumogastric nerves, in a medical student named Ignacz von Kovaco. The young man, who was a willing martyr in the cause of science, had already undergone a number of experiments in which the vagus on the right side of the neck was compressed by himself at the inner edge of the sterno-mastoid muscle, and on a level with the external angle of the thyroid cartilage, by means of the nail of the incurved index-finger of the left hand. The result almost entirely confirmed the conclusion which Ludwig and others have drawn from their experiments on animals: namely, that irritation of the vagus diminishes the frequency of the pulse and prolongs the duration of each individual beat. Dr. Thanhoffer found, however, one point of difference, namely, that there was not, as had been observed in dogs, a marked diminution of the blood-pressure as indicated by the pulse tracing.

The bilateral compression of the vagi was made by Kovaco with the thumb and forefinger of the left hand; the forefinger being on the right and the thumb on the left nerve. The first few attempts were apparently unsuccessful, probably because both nerves were not exactly hit; but the last time Dr. Thanhoffer was startled by finding that his pupil returned no answer to his questions, but kept convulsively pressing his neck, whilst his eyes were starting and glassy. With great difficulty his hand was at last wrenched forcibly from his neck, with the fingers still bent as when compressing the nerves; and even then his consciousness did not immediately return, and it was not until he was lifted from his seat that he began to come gradually to himself, but it was some time before he could stand. He afterwards stated that his sensations at this time were as if his head were bound with iron rings, and as if there was an intense pressure on the whole surface of his body. Soon after the experiment he had a rigor, and began to be feverish, his tongue was furred, and his appetite gone, and he had a feeling of nausea during the rest of the day. Happily he was able to sleep well at night, and only suffered from severe headache the next morning. Since then he has been quite well. The pulse phenomena observed during the compression of the pneumogastrics were,

as shown by a sphygmograph on Kovaco's right wrist, as follows: From the moment when pressure began, the line traced by the liver sank continuously for sixty-seven seconds, then rose again very slightly, and then stood quite still, in consequence of the arrest of the heart's movements. The pulse, which had beaten regularly eighty a minute before the experiment, was seventy-four two hours afterwards, and continued so until one o'clock in the afternoon, the beats being irregular. Immediately after the experiment, Kovaco's pulse and heart's impulse were strong and the heart's sounds clear but soundless. (*Medical Times and Gazette*, July 10, 1875).

Bromide of Camphor.—A monograph on the physiological and therapeutical properties of bromide of camphor has recently been published by M. Pathault, of Paris. Experiments on animals have shown that it reduces the number and force of the pulsation of the heart, and causes narrowing of the calibre of small arteries by its action on the vaso-motor centres—conclusions somewhat at variance with one another, since, whilst it has an inhibitory effect upon the central organs, it acts as a stimulant to the sympathetic in the peripheral portions of the vascular system. It is also stated to have a lowering influence on the rate of respiration and on the temperature of the body, the reduction in the latter respect being rapid and very marked (as much as 3° centigrade in an hour). Dr. Pathault has found that the elimination of the bromide in the urine begins within six hours of the administration of the drug, and is not completed for two days. On the nervous centres it acts as a hypnotic, and also gives rise to choreic convulsions and muscular tremors. Dr. Pathault gives myographic tracings from frogs poisoned with the drug, and shows that they differ from those produced by strychnine (with which it has been commonly compared) in resembling almost entirely the physiological tracing. The drug has been given in doses varying from four to sixty grains with variable results in cases of delirium tremens, insomnia, chorea, infantile convulsion, hysteria, epilepsy, neuralgia, and in some affections of the genito-urinary organs. (*The Lancet*, Aug. 7, 1875.)

Glycerine of Borate of Soda.—Cold medicinal glycerine dissolves its own weight of borate of soda, while 100 parts of distilled water dissolve only 8·3 parts, and 100 parts of hot water dissolve 50 parts, of which 41·67 parts are re-precipitated on cooling. To obtain the desired solution, M. Gaudolphe recommends that 100 parts of medicinal glycerine, and 100 parts of powdered borate of soda be triturated together in a glass mortar until the solution is complete. The solution of the borate of soda in the glycerine may be accelerated by placing

the mixture in a stove or by introducing it into a flask, and submitting this to the action of the water-bath. In gargles the borate of soda is generally combined with honey or honey of roses, or even with syrup of mulberries—that is to say, with products which dissolve a very small quantity of this salt. It would, therefore, be advantageous to combine these with equal parts of glycerine and borate of soda. A definite and considerably more active solution is thus obtained, for glycerine mixes well with honey as well as with syrups. (*British Med. Journal*, Aug. 7, 1875.)

Extracts from British and Foreign Journals.

Treatment of Skin Disease in America.—Dr. Bulkley gives an analysis of 1,000 cases of skin disease treated in the Bellevue Hospital, half of whom were seen by himself. He notes the uncertainty of diagnosis, eczema, for example, including much that might be called by some impetigo and lichen. The order of frequency was:—eczema, 302; acne, 111; syphilodermata, 98; phtheiriasis, 57; psoriasis, 50; tinea, 48; urticaria, 42; scabies, 36; pruritus, 32; erythema, 25; herpes, 22; ulcera, 20; furunculi, 19; dermatitis, 14; pityriasis, 11. The remainder under ten cases each; more than one half of all the patients were females, the excess being 150. The number of children was small. The number of animal and vegetable parasites was very large—one-seventh of the whole number analysed. The proportion of eczema was, as usual in such statistics, one third of the whole, the excess being on the side of the females, in opposition to Wilson's tables. In regard to treatment Dr. Bulkley does not order poultices to remove the crusts of infantile eczema, preferring much to cause their separation by means of fatty matter. Amongst the poor he has the head soaked in cod-liver oil. Sweet almond oil answers also, the idea being to thoroughly protect the irritated mucous layer of the skin and to shield it from air and water. Occasionally the crusts will accumulate and adhere, and it becomes necessary to use a poultice or wash the head well with warm water and borax. He has also used largely, with good results, tannin in ointment (one drachm to the ounce). A very common treatment is to bathe first with the liquor picis alkalinus diluted ten or twelve times twice a day and apply the tannin ointment immediately afterwards. He has also used with very satisfactory results the subnitrate of bismuth in ointment, half-a-drachm to an ounce. Internal treatment is always required, such as cod-liver oil and the syrup of the iodide of iron. In adults in whom the legs are suffering from chronic eczema, elastic stockings should be insisted on. He has had success with tarry preparations. Many cases of ordinary eczema were treated with oxide of zinc ointment, and

as dyspepsia was frequently present, rhubarb and soda mixture was very commonly used, to which he added a little Fowler's solution. In other instances Startin's mixture, containing the sulphates of magnesia and iron, aromatic sulphuric acid and gentian. In regard to *acne* the proportion of males to females was 42 to 69. In its treatment he has largely employed Gubler's plan of giving two or three teaspoonfuls of glycerine three times a day after meals. Citrate of iron and quinine may be given with it. Locally a lotion was applied containing one drachm of washed sulphur, four drachms of sulphuric ether, and three and a half ounces of alcohol. The *syphilodermata* were remarkably numerous—ten per cent. of all the cases. The treatment was by mercury and iodide of potassium. The common method of treatment of *phtheiriasis* of the head in the Bellevue Hospital is to soak the head well for twenty-four hours in kerosene oil, which destroys the animals and their eggs. For lice of the body a combination of caustic potash and ten drachms of carbolic acid in four ounces of water is used, diluting it once or twice at first. To make the cure of any of these forms permanent, the clothing must be either boiled or baked for a long time. *Scabies* in the older patients was treated with sulphur ointment, with the addition of a little carbonate of potash ; in the younger patients with more tender skins the liquid storax or balsam of Peru in ointment was used with equally good if not better results. For *psoriasis* the preparation of tar, *liquor picis alkalinus*, or Hebra's compound tincture of green soap and oil of cade were principally used with diluted mercurial ointments. In many of the more recent cases arsenic and alkalies were given, but no conclusions as to results could be drawn. Dr. Bulkley has obtained, however, very marked effects from the internal administration of tar and potash in the following form :—picis liquidi, ℥ij., potassæ causticæ, ℥j., aquæ, ℥v., giving from 15 to 30 drops largely diluted on an empty stomach. The treatment of acute forms of *lichen* was soothing, of the chronic stimulating, with tar and mercurial ointments. The lichen scrophulosorum requires cod-liver oil. (*American Practitioner*, May 1875.)

Pathology and Treatment of Bronchial Catarrh.—The bronchial walls consist essentially of a fibrous membrane, a layer of smooth muscular fibres, and a mucous membrane. In the larger bronchi, cartilaginous laminæ are intercalated in the fibrous tissue, but these disappear in the smaller ones so that these, like the alveoli, are only kept distended by the elasticity of the interstitial connective tissue. The mucous membrane in the larger bronchi is of considerable thickness, with a thick fibrous layer, and its epithelium is ciliated and laminated. Towards the smaller bronchi it becomes thinner, and ultimately

is only represented by the single layer of epithelium covering the vessels in the alveoli. The muscular layer subjacent to the mucous membrane, unlike the fibrous layer and the mucous membrane, becomes thicker towards the smaller bronchi, and forms a veritable sphincter at the commencement of the infundibula. The different characters presented by catarrhal affections of the larger and smaller bronchi are not, therefore, attributable merely to a difference in the size of the lumen, but rather to a difference in the structure of the wall of the air-passages. The disposition of the blood-vessels is also a matter of great importance in the pathology of bronchial diseases. These run with the lymphatics and nerves in the interstitial tissues, and take part in their diseases. From this point the vessels give out their branches to the bronchi and alveoli. But whilst the lobuli of the lungs obtain their supply of blood from the right heart, through the arteria pulmonalis, the capillary network of the bronchi is fed from the left heart through the bronchial arteries proceeding from the aorta and intercostals; the two systems, however, intercommunicate by means of the capillaries distributed on the bronchi. A certain respiratory activity is attributable to the bronchi through the branches which empty themselves into the pulmonary veins passing to the left heart. Hence, if the left heart fail to evacuate its contents owing to incompetence of the mitral valve, or if the course of the blood of the pulmonary vessels be interfered with by disease of the lungs, a stasis of blood takes place also in the capillary network of the bronchi; and if the aorta or its larger branches on the other side of the giving off of the bronchial artery be obstructed, the blood pressure in the bronchial artery rises, and a collateral flux of the bronchial mucous membrane is the consequence. All these conditions have a decided influence upon the pathology and therapeutics of bronchial catarrh; and it is to be observed that a clear distinction should be drawn between catarrh of the larger bronchi and that of the smaller ones, each of which present modifications in accordance with their acute or chronic course. Acute catarrh of the larger bronchi originates in cold, but may also be propagated by contagion. The contagious matter appears to be connected with the fluid secretion in the first stage, and is distributed in the expired air, especially during coughing. It seems to affect young people and infants most certainly, although the mode in which "catching cold" is effected has not been clearly made out. Rosenthal's observations paved the way for more accurate knowledge. If an animal be placed in a high temperature, dilatation of the cutaneous vessels follows, in consequence of which large quantities of blood stream out from the heart towards the cooler periphery, and a heat-regulating

mechanism is in action, which keeps the animal temperature at about 100° F. If the surrounding temperature exceeds this to some extent, reaching 110°, death soon takes place; all the vessels become dilated, the respiratory movements hastened, the pupils dilated, the muscles relaxed, the pulse too frequent to be counted, and the temperature rises 15°—20° F. If the animal be now restored to the cooler temperature, its animal heat falls rapidly, and this not only to the normal amount, but considerably below it. This considerable fall of temperature, even in air of mean temperature, can only depend on paralytic dilatation of the cutaneous vessels, in which condition a much larger amount of blood than is normal flows from the heart towards the cooler periphery, and is returned to the centre of the circulation. Upon this cooling, after antecedent heating, depends a great part of the so-called "colds"—similar cooling down of the body by very sudden transition from a higher temperature to a lower one, so that the blood returning in a cooled state from the expanded cutaneous vessels quickly reduces the animal heat below the normal, often occurs in man, and in many cases without subsequent damage. Special conditions must be present for cold to be taken. One such has been mentioned above in Rosenthal's explanation—namely, paralytic dilatation of the cutaneous vessels. Many persons, even when exposed to a very high temperature, are not disposed to take cold; they are protected from such action. An additional moment is required, in order that the attack should be concentrated on some definite organ, and this additional moment is antecedent exertion and exhaustion of the organ affected. Thus acute rheumatism follows exposure to cold if there have been previous violent muscular exertion; pneumonia, if to the alternation of hot and cold external temperature and the vascular dilatation there have been great excitation of the respiratory activity in consequence of violent muscular effort in cold, highly oxygenated air, with constant renovation of the reserve air, and most easily of all a catarrh of the mucous membranes accessible to air, if they have been first excited to increased action in warm and especially in moist air, and have then been cooled down by constant renewal of cold air, in which case their capillaries are acted upon in the same way as those of the skin in the instance above given. Acute catarrh of the trachea and larger bronchi originates in this way. The other causes of bronchial catarrh, as dust, &c., are rather connected with the occurrence of chronic bronchitis. Pathological investigation of cases of acute catarrh of the larger bronchi exhibits hyperæmia and redness, swelling and softening, increased secretion from the mucous membrane and its glands. Although epithelial cells are found abundantly in the sputa, yet the membrane is found to have its epithelial layer intact—a

proof that the cells are formed by a simple hyperplastic process. The pus cells, so abundant in the third stage, are chiefly leucocytes that have escaped from the blood, and have penetrated through the epithelial cells, but partly also they spring from the endogenous development of epithelial cells. No other changes are met with in acute bronchial catarrh. The symptomatology is equally simple—cough and expectoration and catarrh from the nasal, laryngeal and tracheal mucous membrane being the first symptoms, which are followed by a degree of fever proportionate to the extent of surface inflamed. Percussion gives unaltered resonance, and on auscultation only rhonchi are heard. In the treatment, the essential point should be to prevent the disease spreading to the smaller bronchi. In the first stage we should endeavour to effect derivation of the blood from the lungs by maintaining persistent dilatation of the cutaneous vessels, and this may be accomplished by heat and tartar emetic, to which opium may be added to relieve the cough and to prevent vomiting. By shortening the first stage, the second is regulated and alleviated. At a later period, solvents, which are uncertain in their action, and expectorants may be used, as ipecacuanha and morphia. Hot rooms should be avoided by those who are liable to the disease, and all means should be employed to strengthen the mucous membrane. (*Der Praktische Arzt*, 1875.)

Treatment of the Chronic Eczema of Children.—Dr. Caspari divides eczema into two varieties: the acute, in which a large part of the cutis, as for instance that of the face, reddens, becomes swollen and hard, and is covered with scales or a purulent secretion; and the chronic form. One form of the disease is found especially in scrofulous children. It consists of a distended and tuberculous condition of a part of the cutis, which is covered with loose frail scales, which latter are continually re-forming and leaving behind them fine cicatrices. The other variety is the ulcerative, which by preference is found over the joints and on the leg below the knee in persons of advanced age, and often leads to ulceration. He considers that all antiphlogistics and mercurials are contra-indicated in the treatment. Iodine and the iodides are also useless, except, perhaps, in scrofulous cases. Tonics, such as the chalybeates, in combination with laxatives like rhubarb, have a much better effect. Fats and spiced foods must be forbidden: the patient should have plenty of fresh air, and the most scrupulous cleanliness should be observed. Frequent bathing seems to afford excellent results. The writer does not think that there is any foundation for the belief of some that external applications should not be made for fear of "driving in" the eruption. The

truth is that eczema does not leave the person until the general condition is bettered. As the most valuable external applications he recommends equal parts of unguentum citrinum and glycerine in chronic eczema of the head and face, especially in children of considerable age; zinc salves in the dry eczema on hairy places, and pure glycerine in eczema of the ear. He does not consider internal treatment of much value. Some persons (especially Dickson of London) have found local applications of concentrated tinctures of iodine and opium to the spine, of value. (*Deutsche Klinik*, 1875, and *Baltimore Physician and Surgeon*).

Hydatids in Australia.—In a paper which appeared in the number of the *Melbourne Medical Record* for March 6, and in the succeeding numbers, it is stated that in no country, with the exception of Iceland, is hydatid disease so frequently met with as in Australia. In 1861 but few cases had been met with in the hospital, but since then it has become one of the most common diseases of the colony. It was, however, not unfrequent long ago in the sheep stations of the country amongst the blacks, partly from eating raw or underdone mutton, and drinking unboiled water from water-holes frequented by sheep dogs and other animals. The writer, who does not give his name, states that he has seen them on the common watercress. In 100 cases of the disease the liver is affected seventy times and the lungs twelve. The upper and middle lobes of the lungs seem to be more liable than the lower lobes; but the lower lobes are very likely to become implicated when the hydatid is seated in the upper part of the liver, from the cyst penetrating the diaphragm, in which case it not unfrequently opens into a bronchial tube.

Bromoform as an Anæsthetic.—Bromoform in a pure state, as obtained by Rabuteau from the action of an alkali upon bromal, appears in the form of a clear, very heavy, and agreeably smelling fluid. Iodine dissolves in it, and colours it of a carmine red colour. The mode of action of bromoform resembles that of chloroform very closely. When administered in the form of vapour there is a period of excitement which is followed by deep sleep, in which there is complete anæsthetic relaxation of all the muscles and dilatation of the pupil. The awakening from the effects of the agent takes place tolerably rapidly, even when the inhalation has been continued for half an hour. Rabuteau hopes that it will come into use. (*Societé de Biologie Séance* du 10 Jan., 1875).

Carbazotate of Ammonia as a Substitute for Quinine.—Dr. I. Slane, of Goalpara, states that, his supply of quinine

being nearly exhausted, and the indigenous antiperiodics failing, he was compelled to cast about him for a remedy with which to supplement his small stock of quinine. He determined to give the carbazotate of ammonia a trial, and proceeded to administer it to his fever cases. Up to the time of his writing (three months' experience of it) he had obtained very gratifying results. He finds it to be a very efficient remedy in the treatment of ague, and, whilst it is far cheaper than quinine, the dose is much smaller. The largest quantity he gave in *any* case was 8 grains in the twelve hours. The salt has no perceptible action in increasing the appetite, but singularly enough, like quinine, after a few doses it produces tinnitus aurium and slight deafness. The urine becomes tinged of a deep orange colour, which stains the clothes under its use, and the skin and conjunctiva may acquire a jaundiced hue, as occurred in two of his cases, but the discoloration soon passed off. He gave it in pill with extract of gentian; but it may also be given in solution, as it is perfectly soluble in water; and the liquor strychniæ may then be combined with it. Its intensely bitter taste is, however, an objection to its use in solution. Combined with a quarter of a grain of extract of nux vomica its efficacy seemed to be much increased. (*Indian Medical Gazette*, April 1, 1875).

Angioma and its Galvano-Caustic Treatment.—Alfred Battig strongly recommends the galvano-caustic method of treatment in angioma. He points out how slight is the general and local reaction as noticed by all operators, and this finds its explanation in the recent researches of Colnheim on inflammation. For Colnheim shows that on the application of an escharotic whatever may be its nature, there is always from the commencement a wide-spreading dilatation of the vessels with gradual degeneration, and that there then forms a central scab—a surrounding zone of stasis, an exaggerated diapedesis from stagnating capillary blood-flow, and an emigration from capillaries in which the blood is still flowing, and from dilated veins; whilst where the red-hot iron is applied there is vascular dilatation with subsequent gradual degeneration, a process that stands in no causal relation with the subsequent processes taking place in the vessels that may properly and specifically be called inflammatory. From an examination of the books and reports of the Breslau Hospital from 1870 to 1873, and of cases treated by Fischer and Maas privately, 47 in all, Battig found that 36 had been treated by the galvano-caustic method, 9 by excision, 1 with electrolysis, and 1 by acid. Most of the cases were seated in the head. One case, which was that of a cavernous tumour on the forehead of a girl of four years of age, which was treated with the galvano-caustic, terminated

fatally on the third day after the operation, by meningitis. In 155 cases under the care of Middeldorpf, Fischer, and Maas, 137 were treated with the galvano-caustic, and only 1 terminated fatally. (*Centralblatt, f. d. Chirurgie*, No. 28, 1875.)

Ice in Diphtheria.—During an epidemic of diphtheria in the spring of the present year, Dr. G. Mayer of Aix-la-Chapelle treated 60 cases with the continuous use of ice-water. From most remedies recommended as specific, the author had previously seen little if any result. Of all internal remedies, chlorate of potash in large and frequently repeated doses appeared to be the most effective. He recommends, however, as by far the surest remedy, in a large majority of cases decidedly life-saving, the continuous use of ice internally, day and night. Of the 60 cases thus treated, only 1 died, a boy five-years old, the disease having extended to the larynx very soon after its commencement. Tracheotomy prolonged life four days without saving it; the operation, during this epidemic, when performed, being followed by good results in only a small percentage of the cases.

In the above cases small pieces of ice were placed in the mouth and allowed to melt, and this proceeding was repeated uninterruptedly day and night for the first two or three days, in the worst cases for a longer time; also as often as possible the patient was given ice-water to drink in greater or less amount. Even with infants eight or ten months old, it is easy to administer ice-water in teaspoonful doses; and the author saw, in the case of a child nine months old, where the mother repeated this every two minutes during the whole of the first night, on the second a decided diminution of the fever and restriction of the local symptoms. The drinking of ice-water has a more decided action than the swallowing of ice in cooling the pharynx. The children generally make great resistance to drinking so frequently, especially during the night, yet, by sufficient perseverance on the part of the attendant, it can be carried out regularly and continuously for the first two days. The drink can be made more palatable by the addition of sugar, or of raspberry or lemon syrup; in some cases also by adding red wine. The ice should be pure, and when such cannot be obtained, the vessel containing the water should be placed in a mixture of salt and ice, and thus lowered to the proper temperature. When there was much swelling of the glands of the neck, ice-bags were applied in the form of cravats, though the occasions requiring this were rare. It was not uncommon with the above treatment to see decided improvement in the local appearance on the second day, and in bad cases the fever did not last longer than from five to seven days; whereas,

by other methods of treatment, especially with cauterisations, the course of the disease was often slow, dragging on for a long time. When improvement begins, generally after two or three days, the child may be allowed to rest at night, but ice should then be given whenever he wakes up. The great advantage of this treatment consists in its preventing the extension of the diphtheritic inflammation especially into the larynx, in the rapid spontaneous loosening of the already formed membrane, in the rapid diminution of fever, and in the prevention of blood poisoning. Cauterisations are condemned as increasing the inflammatory swelling of the mucous membrane, endangering extension into the larynx, and, by opening blood-vessels, favouring blood-poisoning. The author does not claim that this treatment is original with him, but thinks that hitherto its advantages have not been sufficiently emphasised and proclaimed. (*Jahrb. f. Kinderheilkunde, Jahrg.* vii., *Heft*, iv.; and *Baltimore Physician and Surgeon*, Vol. iv., No. 3).

Bromide of Iron in Chorea.—Professor Da Costa, in a recent clinical lecture on this subject (*Medical and Surgical Reporter*) says: "Having now used it for three or four years, my experience, from the treatment of a large number of cases, giving abundant opportunity to witness its good effects, induces me to like it better than any other one article in the treatment of chorea. It should be given in increasing doses, never commencing with less than five grains for a child, and rapidly increasing the dose to twenty. It may be given in plain syrup and water, in the form of a pill, or better, in an effervescing powder. It not only affects the chorea, but also impresses the nervous system as a sedative, quieting it, and giving the patient rest. It is also a valuable agent in treating the incontinence of urine in children. It was in a case of this kind, complicating chorea, that I first observed its value; being surprised and pleased to see that, as the symptom which led to its administration improved, the chorea also diminished and soon disappeared. Since then I have used it almost continuously. Local chorea, or clonic muscular spasm, such as twitching the eyelids, &c., in hysterical women, are sometimes cured by this drug after the failure of other remedies. In answer to the question whether it is the bromide or the iron that benefits, I think it is the combination; that neither *alone* accomplishes the result; for you will find it benefit cases that have previously taken iron without improvement; and as regards the other bromides, we certainly cannot claim for them any especial value in chorea, as they frequently disappoint us. The remedy occasionally fails, as all remedies sometimes do in this obstinate affection, but it certainly is one of the most valuable agents we possess for the treatment of chorea."

The Therapeutics of Ergot.—The committee on therapeutics of the Chicago Society of Physicians and Surgeons, reports as follows respecting aqueous and alcoholic solutions of ergot:—These two differ in their effects upon the circulatory apparatus. The aqueous solution excites the activity of the cardiac inhibitory centres, and the vaso-motor centre in the medulla; it slackens the pulse, narrows the calibre of the small arteries; and increases the blood-pressure. Very large doses paralyze the heart at once, and so effectually that the induced galvanic current fails to restore it. These effects on the heart and vessels are not at all produced by the alcoholic solution. The latter produces symptoms akin to those of acro-narcotic poisoning, viz.: irritation of the mucous membrane of the stomach and bowels, tonic cramps, and agitative violent spasms—symptoms which cannot be produced by aqueous solutions of ergot. (*New Remedies.*)

Hypodermic Effects of Atropia and Morphia.—The following conclusions arrived at by Drs. Mitchell, Keene, and Morehouse, of Philadelphia, appear to be well established:

1. Conia, atropia, and daturia have no power to lessen pain when used hypodermically. 2. Morphia thus used, is of the utmost value to relieve pain, and is more potent in certain forms of neuralgia, the nearer it is applied to the seat of the suffering. 3. Morphia lowers the pulse slightly, or not at all. Atropia usually lowers the pulse a few beats within ten minutes, and then raises it twenty to fifty beats within an hour. The pulse finally falls about the tenth hour below the normal number, and regains its healthy rate within twenty-four hours. 4. Morphia has no power to prevent atropia from thus influencing the pulse; so that, as regards the circulation, they do not counteract one another. 5. During the change of the pulse under atropia, the number of respirations is hardly altered at all. 6. As regards the eye, the two agents in question are mutually antagonistic; but atropia continues to act for a much longer time than morphia. 7. The cerebral symptoms caused by either drug are to a great extent capable of being overcome by the other, but owing to the different rates at which they move to affect the system, it is not easy to obtain a perfect balance of effects: and this was made the more difficult from the fact already mentioned, that atropia has the greater duration of toxic activity. 8. The dry mouth of atropia is not made less by the coincident or precedent use of morphia. Atropia does not constipate, and may even relax the bowels; morphia has a reverse tendency. 9. The nausea of morphia is not antagonised or prevented by atropia. 10. Both agents cause dysuria in certain cases, nor is the dysuria occasioned by the one agent relieved by the other. Atropia has no

ability to alter or lessen the energy with which morphia acts to diminish sensibility or relieve the pain of neuralgic disease. 11. As regards toxic effects on the cerebral organs, the two agents are mutually antidotal; but this antagonism does not prevail throughout the whole range of their influence, so that in some respects they do not counteract one another; whilst, as regards one organ—the bladder—both seem to affect it in a similar way. (*Pacific Medical and Surgical Journal and New Remedies.*)

Ailanthus Glandulosa in Dysentery.—Dr. Cobert, medical chief of the British Navy in China, extols the bark of the root of this tree as superior to ipecacuanha, or any other drug, in the treatment of dysentery. It is intensely bitter, like quinia, and produces vomiting when freely used. Dr. Robert found the dried bark of the root as good as the recent. The Chinese physicians who employ it give a cup of the strong infusion twice a day. The tree grows luxuriantly in all parts of the United States, having been introduced for the purpose of shade. It is a very rapid grower, and propagates itself abundantly by shoots from the root, being almost a nuisance in this respect. The tree is quite common in California, and is known as the Ailanthus, or Pride of China. Some further account of its remedial application may be found in the *American Journal of Pharmacy* for June, 1874. (*Pacific Med. Journ. and New Remedies.*)

Treatment of Catarrhal Jaundice by Electricity.—Dr. Gerhardt, of Berlin, first determines the position of the gall-bladder by percussion at the free border of the liver. This can often be detected by a small rounded prominence at the inferior convexity of the liver, and can easily be made to project. The electrode of a strong inductive electric machine is applied at this point, while the other electrode is applied at the other side of the median abdominal line. Almost always, when the current is powerful, a gurgling sound can be heard, and very often the fæces resume their natural colour, and the cure is effected. (*Ber. Klin. Wochenschr and New Remedies.*)

Nitrous Oxide in Tubercolosis.—Dr. C. W. Larison (*Cinn. Med. News*, November, 1874) reports a case of miliary tuberculosis, in which, after the failure of all ordinary remedies, nitrous oxide was used with most desirable results. Improvement was very slight at first, but steadily increased until complete recovery resulted. Cutaneous circulation assumed its vigour, muscles performed their functions with greater precision, the pulse became stronger and less frequent, appetite became voracious, weight increased, &c. The amount of gas taken was about five gallons a day at intervals. (*New Remedies.*)

Strychnia Eating.—Dr. Morey, in the *Pacific Medical Journal*, gives the following remarkable account of a strychnia-eater in his town:—"I first became acquainted with this man in the fall of 1861, and soon learned of his habit of eating strychnia, after a long and continued debauch, and in a condition bordering on delirium tremens. The first time my attention was particularly called to it, he wished me to give him a bottle of strychnia, which I did at night about bed-time. He took the bottle, poured the strychnia into his hand, and threw it into his mouth as carelessly as though it were salt; and, in the course of half an hour, not feeling the effects from it that he wished, he repeated it, and continued to do so until he became perfectly sober. The quantity required would correspond to the length of time he had been drinking, and the quantity of whisky he had drunk. I was struck with the wonderful effect it had to so completely sober him, and leave his system so entirely free of any nervous disturbance and without the reddened and bloated appearance of the face, the dull heavy eyes, and irritible stomach of the drunkard. After a drinking bout of two weeks' duration, with all the appearance of approaching delirium tremens, he got up in the morning with his mind clear, his eyes bright, his skin clear and fair, and with all the appearances of a man in perfect health and vigour, and ate as hearty a breakfast as usual, and went to his work as though he had never taken a drop of whisky in his life. My curiosity being excited at what seemed so unaccountable an occurrence, I began questioning him as to when he commenced its use, and what induced him to take it, but found him very reticent, and have not to this day ascertained the causes that first led him to its use. All he will tell is that he commenced its use in 1856. From 1861 to 1867 I saw him very frequently, and almost as often have seen him take the strychnia, until it ceased to be a curiosity, except to study its physiological action. In every instance when he took it, every appearance of dissipation would disappear in a very short time. Whether strychnia is an antidote to alcoholic poison, and *vice versa*, was a study for which I could find no authority to guide my conclusions." (*New Remedies.*)

Arsenic as Antidotal to Acute Alcoholism.—Henry M. Fiske, M.D., of San Francisco, writes:—"In the April number of the *Pacific Med. and Surg. Journ.*, I find an article by Dr. Morey on the antidotal powers of strychnia in cases of alcoholic poisoning. It called to my mind a case in which arsenic seemed to possess the same power—the case of Dr. C.—a fellow-student of mine, whom I had known intimately since the year 1840. He became addicted to the excessive use of alcoholic drinks. He was an able physician, and had, both in Michigan and in

this State, an extensive practice, and was well known to many physicians, whose testimony can be had, if needed, to corroborate my statements. He would have an extended spree, varying from one to three weeks in duration. When he wished to sober up at the end, or if, during the paroxysm, he desired for any purpose to be himself again, he would commence and drink half an ounce of Fowler's solution, repeating the dose in one hour, if necessary, and continuing the same dose at the same or shorter intervals, till sometimes he had swallowed the enormous quantity of five or six ounces. He would then be apparently as fresh and vigorous as though he had never been intoxicated, from two to five hours being all the time generally necessary to bring him to his normal condition. Often have I been sent for to consult with him and found him unfit for business, when he would retire to a room, call for or take from his saddle-bags his "Fowler," as he called it, and in two or three hours he would be ready for business. As already hinted, many who read this article will remember him, an honourable, intelligent physician, a noble man in every sense of the word, but who acquired the unfortunate habit of using alcoholic stimulants to excess. He finally died of phthisis, and lies buried near one of our flourishing mining villages." (*New Remedies.*)

Cholera, How to Prevent and Resist it.—Prof. Max v. Pettenkofer propounds a theory, the essential feature of which consists in the prominence given to certain *local* conditions, as favouring the development and spread of cholera. Two elements which he speaks of as the "ground air," and the "ground water" of a locality, hold, according to this theory, the highest significance. For a certain distance beneath the surface the soil is porous and permeated in its pores by air or gases of various kinds (noxious or unnoxious, as the case may be). The amount of this ground air is such as to form more than one-third of the space, which even the most compact gravel occupies; this ground air will diffuse through the soil, will rise into the superjacent atmosphere, or take other various directions of current in accordance with ordinary physical laws, and this will, to some extent determine the health of a district. The active and uninterrupted communication which exists between the air within and around our houses, and that contained in the ground beneath them, is a fact, the investigation and establishment of which constitutes a highly important result of Pettenkofer's labours, and shows in how many other and more subtle ways than those more commonly acknowledged ashpits, cesspools, &c., may act in contaminating the health of a district. Moreover, this surface soil is everywhere more or less damp, and as we dig downwards in most places we arrive at a stratum which is saturated; this saturated stra-

tum eventually lying upon one that is impervious to water. The rise and fall of this ground water is then, according to Pettenkofer, another important element in determining the hygienic condition of a locality. The water lying in this saturated stratum is termed the ground water. The observations of Pettenkofer in Munich, extending over sixteen years, show that increased mortality invariably accompanies a low state of the ground water. The explanation of this may be given as follows: Let us suppose that just before the outbreak of an epidemic of cholera in a town, some very minute seeds have been imported and dropped into the ground which had been rendered favourable for their growth by the sinking of the ground water, as noticed in the wells. After remaining for some time in the damp soil, the seeds become ripe and acquire a poisonous character, and rising with the ground air float about in the atmosphere. Here they come into contact with the inhabitants, and effect an entry into the bodies of many with the air they breathe, in food or otherwise. A certain number of these take cholera, and within their bodies the seeds undergo a further development, and their numbers become enormously multiplied. These are expelled with the dejections in an immature state, or at all events, not in a state to produce epidemic cholera, until after they have lain in a suitable soil for some time. A sufficient quantity of full ripe seed might be transported from one town to another with dirty linen, &c., to infect one or two persons directly, but not enough to produce an epidemic. The persons thus infected would be poisoned by the seeds bodily conveyed from the cholera district, and to all intents and purposes they might be regarded as having been placed in the same circumstances as those who were living in the infected place. Now the cases thus occurring through contact with the imported seeds will result in an epidemic if the local and temporal conditions be favourable; otherwise the place will escape in spite of the importation. The hygienic rules to be observed, if these views be correct, are sufficiently obvious, and one of the most important is that every possible precaution should be taken *before* the outbreak of an epidemic. All arrangements, for example, which relate to the protection of the soil from contamination, or its better drainage, will be perfectly useless if they are only commenced at the time of the outbreak of an epidemic, for it requires much time and care before an impure impregnated soil can be rendered uncontaminated. (*Irish Hospital Gazette*, May 15, 1875.)

Treatment of Functional Headache.—For the headaches which depend on anæmia of the brain, usually resulting from nervous exhaustion, and following mental work or physical fatigue, Dr. McLane Hamilton gives tea or cocoa at the time, and recommends the following prescription:—

℞ Strychniæ sulph. gr. i.;
Acidi phosph. dil.;
Tr. Ferri. chlor. aa ℥vi.;
Aquæ camphoræ ad. ℥iv.

Sig.—A tea-spoonful after eating.

Aromatic spirits of ammonia and sherry may be given several times a day with good effect. Muriate of ammonia is an invaluable remedy in these headaches, particularly in hemicrania. It should be given in very large doses—from ten grains to thirty—every hour until relief is obtained.

The *hyperæsthetic* headache demands opposite treatment, and is aggravated by stimulants. These are the cases where there are redness of the face, tense carotids, injected conjunctivæ, heat of skin, restlessness and confusion of the mental faculties. During the paroxysms the hands and feet are generally cold, and the patients suffer from sleeplessness. For these he believes bromide of sodium to be the most efficacious remedy, and next to it the bromide of calcium. He recommends:

℞ Sodii bromidi, ℥i.;
Fld. ext. ergotæ, ℥i. p.;
Aquæ camphoræ, ad. ℥iv.

Sig.—A tea-spoonful every three hours, or two tea-spoonfuls at night.

In these headaches, cardiac sedatives, such as aconite and veratrum viride, are of great service, and the continued use of digitalis combined with zinc is beneficial. For the headaches of inebriety he uses the monobromide of camphor, and sometimes applies leeches or cups. A common class of headache are those depending on reflex causes, and may be called the inhibitory headaches. They are often associated with indigestion or disturbance of the uterine functions, but there are some points of irritation which may readily be overlooked, such as hæmorrhoids, which often cause headache associated with great restlessness and fatigue. Its seat is usually in the frontal region, and it comes on very suddenly. The conditions occasioning these headaches are to be met by special interference and proper remedies.

In rheumatic headache the pain is superficial, and there is a diffused hyperæsthesia over the scalp which is very sensitive to touch. This is generally amenable in a few minutes to the faradaic current applied by a wire brush. In the headaches which are almost invariably associated with syphilis the inunction of mercurial ointment is often useful. The suboccipital headache of malaria is often uncontrolled by quinine alone. The combination of arsenious acid is of great use, and

the addition of a small quantity of belladonna increases its effects still more.

In neuralgia he finds the following prescription serviceable:

℞ Morph. sulph., gr. vi.;
Ext. belladonnæ;
Ext. nucis vomicæ, āā gr. xii.
Ferri et quiniæ citrat. ʒii. p.

Ft. massa et divid. in pil. No. xlviii.
One three times a day.

Strychnia is of great benefit in the anæmic variety of neuralgia. Peripheral neuralgia is treated most successfully by local applications such as galvanism, chloroform, blisters, and the actual cautery. The inhalation of a few drops of nitrite of amyl often stops a severe neuralgia. Morphia injected subcutaneously is one of the best remedies; and it is perhaps even more efficacious when combined with atropine than when employed alone. Freezing the skin just in front of the ear, by ether spray, will cut short a violent attack of facial neuralgia in a few moments. In employing galvanism, the poles should be held over the nucha or lower down, and over the mastoid bone or upon both temples. In neuralgia the positive pole may be held just at the back of the ear, and the negative passed over the several branches of the fifth nerve. The faradaic current often relieves many headaches, particularly if they are diffused over the scalp, and if they are aggravated by heat to the head or pressure. Cold applications, such as bladders of ice, or the cold douche, are especially useful in headaches belonging to the hyperæsthetic variety. (*Philadelphia Med. Times*, v. p. 289).

Novel Treatment of Sciatica.—Dr. J. Pretz (*Weiner Medicinische Presse*) gives as his personal experience the following facts. Having an attack of sciatica for six months, he tried all the ordinary remedies with no avail. Observing that his attacks were slighter after eating, he determined to eat as often as the pain recurred. This was often twelve times in twenty-four hours. He constantly improved under this treatment, and in about two months entirely recovered. Two other cases were afterwards treated with similar results. He accounts for the result by the development of heat from the food and drink. (*Philadelphia Med. Times*, v. p. 226).

Treatment of Severe Asthma.—In this disease the injection of five grains of chloral, subcutaneously, in twenty minims of water, is recommended in the *Philadelphia Med. Times*, v. p. 299.

Notes and Queries.

Cod-Liver Oil Emulsion.—This emulsion is of a white colour, of about the consistency of thin honey. It contains half its bulk of cod-liver oil so intimately mixed with some vehicle that it does not separate even after standing for weeks, and agreeably flavoured so as partially to cover the taste of the cod-liver oil. Besides this, Messrs. Richardson, of Leicester, who prepare this emulsion, have also made two others, one of which—the cod-liver oil emulsion with quinine—contains half a grain of quinine; and the other, phosphorized cod-liver oil emulsion, contains $\frac{1}{50}$ of a grain of phosphorus in each ounce of the emulsion. All of these may prove palatable to patients who dislike the plain cod-liver oil.

Pepsin-Essenz.—This is a preparation of pepsine made according to a formula given by Professor Liebreich. It closely resembles the pepsine wine ordinarily used in this country. It does not dissolve meat nearly so readily as the pepsina porci of the British Pharmacopœia, though its digestive power in this respect is quite as great as that of pepsine wine. It is, therefore, not so suitable for adults as the pharmacopœial preparation, but it possesses to a considerable degree the power of coagulating milk, and it may therefore be advantageous in the dyspepsia of infants. The agents for this county are Messrs. Corbyn, Stacey, & Co.

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Bronchial Hæmorrhage. By J. W. Macdonald, M.B. 8vo. pp. 20. London: Churchill.

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. Any of the foreign works may be procured on application to Messrs. Dulau, of Soho Square, W.C.;—Williams and Norgate, of Henrietta Street, Covent Garden, W.C.;—or Baillière, of King William Street, Charing Cross.

Department of Public Health.

SANITARY WORK IN INDIA.

If the sanitary work done in India had any reasonable proportion to the vast quantity of official publications issued annually on the subject, that great dependency might well be congratulated. But for the annual synoptical account of this literature, which since 1867 has been published by the Secretary of State for India, much would be wholly unknown in England; and even with the assistance of this account (itself now a formidable volume) it is difficult, short of the devotion of a lifetime, to obtain a competent acquaintance with the various reports from which it is chiefly formed. It is not surprising that rumours have been lately afloat that the India Office and Indian Government have become aghast with the overwhelming and increasing bulk of the sanitary literature for which they are responsible, and which by reason of its very bulk threatens to become useless, whether for practical or for scientific purposes. Measures are now being contemplated, it is believed, for bringing the system of sanitary reporting in India into some more comprehensive form, by which while the redundancies which disfigure it are got rid of, its practical and scientific value may be brought more within the capacity of beings whose days are measured by ordinary seconds, minutes, and hours. What part in effecting the proposed change is to be played by the India Office, what part by the Indian Government, we have no means of knowing, but certain changes recently made in the sanitary administration of the India Office are not, if left unexplained, of a nature to beget confidence that the evil is about to be dealt with in a way altogether to be desired. The *Sanitary Department* which formerly existed at the India Office, has recently been merged in a new department designated of *Statistics* and *Commerce*, and the term *Sanitary* has been abolished in the administrative business of the Office. To English readers this

appears like the relegation of sanitary work to a very subordinate position in the Indian administration; and it is difficult to understand other than that it must exercise, as indeed it implies the operation of, an unfortunate influence upon Imperial and Local sanitary administration in India. It suggests, moreover, that the rumours of some modifications being designed in the manner of Indian sanitary reporting may simply express the natural utter weariness and bewilderment arising from the annual avalanche of printed reports which is poured into the India office, and the determination to get rid of the good by some simple process of excision rather than by placing the vicious system, of which the reports are the indication, upon a sounder basis.

Indian sanitary reporting is certainly the most marvellous phenomenon of sanitary administration in these days. It appears to have been undesignedly founded upon an ingenious inversion of a well-known rhyming jingle, and its principle may be thus expressed:—

> "Little fleas have great fleas upon their backs to bite 'em,
> And great fleas have greater fleas, and so *ad infinitum*."

First we have the reports of the local sanitary commissioners of the several Presidencies: then we have the reports of the General Sanitary Commissioners upon these reports; next we have the reports or minutes upon these several reports of the Secretaries or other principal administrative officers of Governments; and finally we have the reports upon all these reports of the Army Sanitary Commission, to which Commission all the sanitary reports for India appear to be submitted indiscriminately by the India Office. The several commentators or sets of commentators do their work of criticism with the most charming freedom, and the profoundest and most complex questions of etiology are dealt with after the same fashion as the simplest questions of drainage, leaving the effete procedure common to the temperate zone in such matters hopelessly in the rear.

We are so unfamiliar with the mysteries of Indian administration that we are not prepared to say that this is not the proper kind of sanitary reporting for that Empire; but it certainly conveys here a notion of the painful crudity of the conceptions which must be entertained at the India Office of the relations of the local to the central sanitary administrations, both of the Presi-

dencies and of the Imperial Government. There is a want of just conception of the respective positions of the scientific etiological, of the statistical, and of the practical elements of sanitary administration which to home-bred notions is simply amazing, and which must be a source of constant vexation to the responsible administrators of the Indian Government, and must ultimately exercise a most disadvantageous effect upon Indian sanitary work. The administrators must be in a continual whirl of discussion and buffeting amidst diverging advisers, each successive adviser complicating the advice of his predecessor. No certain distinction being made between the determined results of sanitary experience and the debated questions of etiological research, confusion is the result, which cannot fail, so long as it continues, to have a most unfortunate effect upon sanitary science and practice. An illustration of such confusion, and of the peculiarities of Indian sanitary reporting to which we have referred, is given in the last synoptical report of the India Office.[1]

Prominence is chiefly given in this report to Dr. Cuningham's report on Cholera in Northern India to 1872 (contained in his 9th Annual Report). So important is this deemed that, in addition to a very full abstract of the report, the notes of the inquiries upon which it is founded are given in detail. As our readers have already some acquaintance with this work, it will simplify our present object to follow the lead of the synoptical account. First, in the body of the account, attention is drawn to the fact that the Army Sanitary Commission "express their sense of the important service which Dr. Cuningham has rendered to the history of Indian cholera by the report;" and that they consider it "of great value, for this reason amongst others, that it has brought certain important questions regarding cholera to an issue. The appeal now made" (they say) "sets aside all opinions and theories, and requires to be answered solely on the facts." In the appendix to the account is given the detailed memorandum of the commission—a memorandum which we should advise such of our readers as indulge in cholera literature to bind up with the report to which it refers.

[1] "Report on Measures adopted for Sanitary Improvements in India, from June 1873 to June 1874; together with Abstracts of Sanitary Reports for 1872, forwarded from Bengal, Madras, and Bombay." (*Printed Under the Secretary of State for India in Council*, 1874.)

The Commission first discuss at some length the distribution of cholera in Northern India in 1872 with reference to the distribution in 1871. We limit ourselves here to the simple question of distribution in reference to Dr. Cuningham's conclusions. The Commission shows that cholera in 1871 (they write "the cholera of 1871," as if the disease were an entity) was present in nearly all the more important districts throughout India from January onwards. "If," say they, "the places at which cholera deaths were registered in 1871 and 1872 be compared, it will be found that the law of distribution of the disease, as distinct from the law of intensity, was essentially the same in both years." They further say:—"The cholera of 1872 passed over in certain parts of India from the cholera of 1871; and that cholera simply as such did not appear to spread from any centre; it was, on the contrary, present over portions of the whole epidemic region in the first month of the year; and that in the majority of districts it continued more or less throughout the year." The important bearing of these statements upon Dr. Cuningham's conclusions as to the influence of human intercourse on the dissemination of the disease in 1872 will be obvious. He considers this question in two principal lights: first, with reference to the relationship of outbreaks to preceding prevalence of the disease in adjoining districts, and next to the influence of railway travelling on its diffusion. Generally, he deals with the epidemic of 1872 as a dissemination from the endemic area of cholera in the Lower Provinces. According to the Army Sanitary Commission, whatever dissemination from the endemic area may have occurred, this must have taken place in 1871, and not in 1872; and consequently the conditions for solving the particular problems which Dr. Cuningham set himself to solve as to the influence of human intercourse in disseminating cholera did not exist. The epidemic of 1872 arose in districts previously occupied by cholera, and required to be studied with reference to this cardinal fact. Dr. Cuningham has not done this.

Again, the Army Sanitary Commission show that "the cholera of 1872 afforded statistical proof of the old observation, that cholera attacks the native population before it attacks the troops;" and they add the important observation, "the practical

bearing of facts of this class regarding the movement of troops is very important, for if the experience of 1872 is found to be the rule, it would appear that the real time for action is when the civil population is attacked, and that, when troops are actually suffering, the evil is done." Now, it is just at this point of the relationship of the appearance of cholera among the troops subsequent to its appearance among the native population amidst which they live, where Dr. Cuningham leaves us, in respect to transmission of the disease by human intercourse, most hopelessly in the dark. He shows, when speaking of quarantine, that the relationship between the troops and the native populations is necessarily such that sanitary cordons applied to cantonments must be impracticable in practice and utterly fallacious as a means of protection against contagious disease; but he fails to observe that these conditions are fatal to a precise study of the question of transmission of the disease. It would be more easy to study the phenomena of dissemination of scarlet fever or measles in a big town, than to study the precise modes of transmission of cholera under such circumstances. Here also, as in respect to the general dissemination of cholera in Northern India in 1872, the necessary conditions for studying the question Dr. Cuningham set himself to solve, did not exist, and his conclusions as well as the inquiries on which they were based were as a consequence fallacious.

The Army Sanitary Commission fail to appreciate the extreme importance of the facts they discuss upon Dr. Cuningham's conclusions; but they none the less deserve gratitude for eliciting them so fully. Coming to the question "how cholera got to the stations," the Commission clinch the facts already referred to, observing :—

"Is there proof that can be turned to practical use that it was imported, or must we look to more general and local causes for its prevalence? The following facts on this subject, given in the notes, are merely an instalment of what it is desirable to learn, and must be taken as such :—

"(1) As already stated, in all the districts where the stations are situated the cholera of 1872, among the native population, passed over from the cholera of 1871, and the disease *was committing ravages for months among the native population before it attacked the troops.* [The italics are ours.]

"(2) At several hill stations the troops were attacked first or contemporaneously with the civil population.

(3.) Out of twenty-six stations of British troops attacked by cholera in 1872, the annual statistics of which are given, only six yielded cholera cases in 1871: but a reference to Dr. Cuningham's report for 1871 shows that deaths from

cholera were registered in 1871 in every district (except perhaps at certain hill stations) among the civil population in which these twenty-six stations are situated."

Now suppose the question had been, instead of "how cholera got into the station?" "how got small-pox or scarlet fever there?" the circumstances of previous prevalence among the surrounding population being held as of no account. The failure to discover the link of connection must have been just as complete as it was to discover the link of connection with cholera, even assuming that cholera had been contagious after the same fashion (which it is not), but this failure by no means implies that the link does not exist. Here is the fallacy which Dr. Cuningham stumbled over, and which the Army Sanitary Commission fails to see. Grouping the results of Dr. Cuningham's inquiry on this subject, the Commission write, "Outbreaks in which no source of importation *could be* traced," 88; the fact being, "Outbreaks in which no source of importation *was* traced." The one form of expression, the first, implies that both the method and conditions of inquiry admitted of its being properly and thoroughly prosecuted; the other form of expression implies nothing more than the fact, irrespective of method and conditions of inquiry. The one form of expression betrays inexperience in dealing with complicated etiological questions; the other form avoids the implication of an important opinion touching the whole question under the apparent cover of a mere statement of fact.

Of the question of communicability of cholera after it had gained admission to stations, the Commission observe that "the information is not always so very specific in character."

Proceeding with their examination of Dr. Cuningham's report, the Commission observe upon the notes and inquiries attached—in other words, the statement of facts upon which Dr. Cuningham founds his conclusions—as follows:—

"One section of the notes refers to the local sanitary conditions accompanying the great mortality among British troops in 1872. These notes purport to have been drawn up at affected stations by local sanitary advisers, and yet we can find little to help us to reply to the main practical question raised by this report—namely, what removable conditions can be grappled with so as to diminish the susceptibility to cholera among troops in future. In regard to some outbreaks, no allusion is made to the subject. In most cases the information is limited to casual remarks about the drainage or about wells.

"As no reference is made to the condition of the water-supply as shown in the reports on water analyses at the stations, there are no means of estimating the relation between the quality of the water and the amount of cholera.

"There is no evidence to sustain a current theory that cholera poison conveyed in water is the cause of cholera."

These remarkable sentences are probably unique in the sanitary literature of the present day. We have here the deliberately expressed statement of the Commission that with regard to the localising causes of cholera—the causes to which practical measures can be applied, and which should solely concern their functions—that the reports are so imperfect as to be almost valueless. Nevertheless, reports which do not touch the only controllable causes of cholera of which we have any experience, —which are wholly insufficient as to the data they furnish for common sanitary purposes, are held by the Commission to be sufficient foundation for the formation of opinions adverse to existing knowledge of some of the most complex questions of etiology! Nay more, the data which are insufficient for common practical sanitary purposes, and which do not include ordinary information even as to the chemical quality of the water-supply, are held to justify the Commission in expressing the conclusion that they are adverse to the opinion that cholera may be propagated through the water supply! Nor is this all. As if to make absurdity still more absurd, the Commission, by the phraseology of the last sentence quoted, namely—"a current theory that cholera poison conveyed in water is *the* cause of cholera"—betray a complete unacquaintance with English and European knowledge on the subject, for no such theory exists or ever did exist, as the simplest reference to so common a work on Hygiene as Professor Parkes's would have shown.

This is an example of what passes for sanitary science at the India office, and of the reasoning which is suffered to guide the vast interests involved in sanitary research and practice in India! The opinion of the Commission on Dr. Cunningham's report already quoted:—"that it has brought questions regarding cholera to an issue. The appeal now made sets aside all opinion and theories, and requires to be answered solely by facts."—must be read in the light of these sentences.

The question here touched upon, of the value of Dr. Cunningham's data for the scientific purposes to which he has applied

them, is so essential that we quote two of the Commission's practical conclusions on the subject:—

"The reports contain very little information regarding the sanitary condition of affected localities, and in the present state of sanitary knowledge Government has a right to expect that the reports on epidemic diseases from stational sanitary authorities should deal especially with local causes. The authorities should report on their nature and extent in detail, together with the steps taken for their removal.

"From a number of stations casual notices lead to the impression that the hygrometrical condition of the subsoil, and the subsoil water level, may have exerted an important local influence on the intensity of cholera, and that this point, which has been frequently urged for many years past, should be taken up and dealt with."

In other words, in all that concerns the study of those local conditions, the minute examination of which in Europe has, during the last twenty years, been so prolific in knowledge of the etiology of cholera, the reports are radically defective; yet in the opinion of the Commission they suffice for dealing with the most complex questions, and render necessary a reconsideration of European teachings on the subject!

We need not wonder now at the marvellous character of Indian sanitary reporting. It is obvious that everybody—medical, engineer, military, civilian, &c.—is deemed to be capable of treating of every phase of sanitary science irrespectively, and that the value of the opinion is determined solely by the administrative position of the individual. The one essential thing is clearly that everybody should express his opinion in writing upon everything within the scope of a report, regardless of previous training or fitness. The Army Sanitary Commission is a mixed commission of military men, engineers, and medical men, exceptionally qualified for dealing with the practical aspects of sanitary work, but having obviously no qualification to deal with those questions of sanitary research which demand above all things special training and experience. The very notion of submitting to a mixed Commission, notwithstanding the deserved respect in which the individual members may be held for their particular qualifications, questions which demand for their examination competent judgment, special training, and special knowledge, shocks common sense, to say nothing of scientific sense. The natural result must be, as is now threatened, to dissociate Indian sanitary research and practice from European sanitary re-

search and practice, as if these were essentially different things to be governed by different principles of ratiocination. These questions of etiology are necessarily medical questions, and the effect of submitting the reports of competent medical observers, so far as these relate to matters of etiology, to the comments of the Army Medical Commission, must deteriorate medical sanitary work. What encouragement can be afforded to medical men to pursue difficult etiological researches in India, if they are to be ultimately subjected to crude observations such as the Army Sanitary Commission make upon them? How much of the indifference displayed in the notes of inquiries attached to Dr. Cuningham's report, and their imperfections, rests with the want of respect which must be very generally felt for the ordeal of ill-advised and injudicious criticism to which the reports would be exposed?

The question deserves the consideration both of the India Office and of the Indian Government. When we reflect upon the wealth of talent which official medicine possesses in India, and compare the meagreness of its contributions of late years to the scientific etiology of cholera, compared with what has been done in this country, it is obvious that medicine in India must be placed under some particular disadvantages that do not exist here. Foremost among these, we believe, is that vicious system of indiscriminate accumulative criticism we have described. We see no certain hope of escape from the difficulties of this system, and of due justice being done to the vast sanitary interests of India, except by giving to the Medical Officer of the Indian Council special sanitary functions, or by the appointment at the India Office, in addition to its present distinguished medical adviser, of a medical sanitary adviser, whose previous experience and scientific training would command the respect equally of the trained sanitary knowledge of Europe and of India. India has more than one man competent for the post, and whose appointment would mark the most important step yet made to bring the vast works now being undertaken for the sanitary benefit of India into some common accord.

THE HEALTH OF OUR WATERING-PLACES AND HEALTH-RESORTS.

It is not sufficiently well known that the Registrar-General now in his second quarterly report for the year, customarily gives a special section to watering-places and health-resorts. He brings together in this section the more important data as to the mortality, during the same quarter, of the registration districts or sub-districts in which the principal resorts are placed, and taking these as indications of the probable health-state of the different places, suggests their utility as a guide for visitors to them. The time has not yet come, we apprehend, when the temporary fugitives from towns to the sea-side and the country will care to govern the direction of their pleasant flight by considerations of death and disease in the places they fly to. Other and more grateful considerations of locality and scenery will doubtless most potently influence their decision. But there are some who, having regard to invalids and especially to young families, may find it desirable to give some attention to the probable state of health of, and prevalence of infectious disease in, places, in making a selection. To these persons a knowledge of the feature of the Registrar-General's Second Quarterly Report to which we have referred will be of utility. It will also be of use to medical men who may be called upon to advise as to resorts.

The death-rate of the quarter, which constitutes the chief element of the Registrar-General's indication, is approximative only. But as we are assured by him that the elements of doubt in it as a rule neutralize each other, they need not be discussed here, and there can be no good reason for not accepting the facts he gives in the sense he would have them accepted, namely, "as useful guides with others to aid inquirers in their endeavours to place their families for a season in healthy localities." The Registrar-General points out that all the districts containing the English health-resorts are under the charge of medical officers of health, and that the sanitary authorities in some, as Llandudno, are engaged in carrying out extensive sanitary works.

It is to be regretted that the publication of the report takes

place almost too late to be available for the guidance of visitors to health-resorts, but we give the facts as recorded.

Districts or Sub-districts containing the principal English Watering Places ranged in the order of their Mortality during the Second or Spring Quarter of 1875.

	Annual Rate of Mortality per 1000 living, from	
	All Causes	Seven Principal Zymotic Diseases
England and Wales . .	21·9	
Seaside Towns.		
Littlehampton	12·6	1·7
Bognor	12·7	0·0
Weston-super-Mare . . .	13·5	0·7
Southend	14·9	0·5
Dover	14·6	0·5
New Brighton	15·2	1·2
Scarborough	15·3	1·1
Torquay	15·5	0·8
Weymouth	15·9	1·5
Ramsgate and Broadstairs .	16·0	0·7
Tenby	16·2	0·4
Herne Bay	16·6	0·7
Sidmouth	16·8	0·3
Exmouth	17·2	1·0
Eastbourne and Seaford .	17·5	1·6*
Yarmouth	17·6	1·8
Brighton and Hove . .	17·8	1·4
Lowestoft	17·8	1·7
Blackpool and Fleetwood	17·9	2·4*
Isle of Wight	18·0	1·4
Dawlish and Teignmouth .	18·1	1·8
Dartmouth	19·4	0·6
Worthing	19·6	0·4
Deal and Walmer . . .	19·8	0·9
England and Wales . .	21·9	
Seaside Towns—*continued*		
Hastings and St. Leonards .	20·6	1·0
Eastbourne	20·8	0·6
Rhyl	20·9	0·6
Margate	21·7	1·7
Lyme Regis	22·9	1·9
Folkestone	23·0	0·5*
Penzance	23·6	2·0
Ilfracombe	23·2	1·8
Whitby	24·2	3·8*
Aberystwith	24·4	2·6*
Southport	25·2	2·6*
Bangor	26·8	1·7
Llandudno†	28·0	2·6*
Inland Towns.		
Buxton	13·0	0·5
Clifton	15·4	2·1
Tunbridge Wells . . .	16·6	0·6
Leamington	16·9	1·0
Malvern	17·4	2·4
Matlock	18·7	0·7
Bath	19·4	0·7
Cheltenham	19·5	0·5
Harrogate	20·8	0·3

* The details of the deaths which caused a Zymotic rate exceeding 2 per 1000 in the districts or sub-districts containing the following towns, are—

Eastbourne and Seaford: 10 deaths were referred to whooping cough, 4 to fever, 1 to diphtheria, and 1 to measles.

Blackpool and Fleetwood: 5 deaths were referred to diarrhœa, 2 to fever, 2 to scarlet fever, 2 to whooping cough, 1 to diphtheria, and 1 to small pox.

Folkestone. 15 deaths were referred to measles, 1 to small pox, 1 to fever, and 1 to diarrhœa.

Whitby: 11 deaths were referred to whooping cough, 2 to fever, 1 to diarrhœa, and 1 to diphtheria.

Aberystwith: 7 deaths were referred to measles.

Southport: 7 deaths were referred to whooping cough, 4 to diphtheria, 3 to fever, 2 to diarrhœa, 1 to measles, and 1 to scarlet fever.

Llandudno: 7 deaths were referred to whooping cough, 2 to fever, and 2 to diarrhœa.

† The Health Officer states that of the 28 deaths in the town of Llandudno, 9 were of visitors, not one in sound health on arrival.

A Report of Microscopical and Physiological Researches into the Nature of the Agent or Agents producing Cholera.—2d Ser. By T. R. Lewis, M.B. and D. D. Cuningham, M.B., 8vo. pp. 60. Calcutta.

This work is one of the Appendices to the Tenth Annual Report of the Sanitary Commissioner with the Government of India, and small though it be it contains much valuable matter, the result of many laborious experiments. The work is already so much condensed that almost every sentence in it should be read with care and re-read by those who are interested in the subject of the causation of cholera. The first part contains an account of the microscopic examinations of blood made by the authors in order to decide as far as possible whether or not any organism which might be regarded as the cause of cholera exists in the blood of persons suffering from this disease. They draw particular attention to the deceptive appearances resulting from the rapid erosion of the thin covering glasses in India. These sometimes simulate milky spots, cells, and bacteria. The authors point out that the appearance of the "zone immobile" of bacteria, observed by MM. Coze and Felz as well as by M. Davaine in certain infectious diseases, agrees very closely with that due to glass erosions, and that the latter might very easily be mistaken for or confounded with organic particles. The echination or tuberculation of red corpuscles on which some authors have laid much stress, can be produced by the pressure of the covering glass, but sometimes occurs in healthy blood independently either of pressure or evaporation. Granular and molecular matter, which might be supposed to be of a bacteroid nature, almost invariably becomes liberated from the white corpuscles during the process of disintegration, and motile particles, the nature of which is undetermined, are sometimes observed in the blood of persons apparently in perfect health. Fibrinous threads were twice seen, but fungi were absent except on one occasion when they were probably due to accidental contamination. In no instance were bacteria observed. Considerable leucocytosis was present. The red corpuscles were diffluent. In order to determine whether the blood in diseases which are certainly inoculable differed from that in cholera, the authors

examined it in vaccinia and syphilis, but in neither disease could they detect any foreign organisms.

Having thus failed to detect bacteria or their germs as an essential feature in the blood of cholera, vaccinia and syphilis, the authors next tried to ascertain under what circumstances such bodies are to be found. They occur both in the blood and tissues of healthy animals, especially in the mesenteric glands and mucous membrane of the small intestine, but it is probable that they are developed after death. In one case they were observed in abundance immediately after death, but when the animal was killed, it was already moribund from inflammation induced by the injection of liquor ammonia into its peritoneal cavity. In some healthy animals long and jointed bodies, resembling Cohn's *Bacillus subtilis*, were found, and this suggested that the presence of "Bacteridia" in malignant pustules might be more a consequence than a cause of the disease, especially as Cohn refers these particular "Bacteridia" to the genus *Bacillus*. If septicæmia and diseases of a similar nature were due to the presence either of vegetable organisms or of living matter of any kind, the virus by which they are communicated ought to lose its activity when they are killed by heat, but this is not the case, for Striker and Panum find that boiling does not affect the virus of septicæmia, and Davaine states that neither boiling nor rapid desiccation affect that of charbon.

In many of the diseases to which a vegetable origin has been assigned, the blood affords evidence of considerable leucocytosis, but as far as the authors' observations go, leucocytosis is incompatible with the simultaneous development of bacteria in the blood, the latter being worsted in the struggle for existence, or as we may perhaps more plainly put it, being eaten up by the leucocytes.

The conclusion at which the authors arrive is that "it is possible that all the diseases ascribed to vegetable parasites, may in reality be due to the influence of such organisms, but the proof of it has yet to be produced, and it is no real advance to ascribe them to such an origin on insufficient ground. This theory has attractions for many on account of the apparently simple explanation which if true, it would afford of the multiplication of disease poisons. But even allowing that such a

multiplication could only take place under the influence of living matter, not as the result of any mere chemical process, it must always be borne in mind that the manufacture of the poison must in any case occur under the influence of multitudes of living cells and particles, cells and particles which may be just as capable of elaborating poisons as vegetable organisms or other living matter introduced from without.

The second part of the work treats of the effects produced by the introduction of choleraic and other fluids into the system. Both cholera dejections and those of persons in good health when injected into the veins of dogs act in some cases as a poison, producing disorganisation of the intestinal mucous membrane. The symptoms and pathological changes induced by both substances are alike, but strained choleraic dejections produce positive results in 44·7 per cent., while solutions, by no means weak, of normal alvine discharges, gave them in only 26·9 per cent., or only a little over half the former number. Excrementitious matters produced a much greater effect when introduced into the abdominal cavity than when injected into the blood, for in the former case they caused serious inflammation and commonly death in 76·9 per cent. Inflammatory products were not so active, for similar experiments with them were only successful in 23 per cent. The application of heat up to the boiling point did not modify the toxic properties of the particular substances tested; for when boiled cholera evacuations were injected, 47 per cent. of the dogs were affected or rather more than when unboiled dejections were employed, and when boiled ordinary alvine discharges were injected, the percentage was 23, or rather less than when unboiled were used. In this power of retaining their virulence after boiling, alvine dejections correspond with cobra poison, which the authors, like Fayrer and Lauder Brunton, found to be active after exposure to a temperature of 212° Fahr. In the third part of the report, the authors confirm the statement of Moreau that complete section of the mesenteric nerves causes profuse flow of fluid into the intestine, and find, like Lauder Brunton and Pye-Smith,[1] that this result is not induced by division of the splanchnic nerves even when this is combined with excision of the semilunar ganglia.

[1] Reports of the British Association for 1874.

INDEX TO VOL. XV.

A.

Abscess of the breast (M. Gillette), 451
Aconite and aconitina, their physiological properties (M. Guillard), 449
Ailanthus glandulosa in dysentery (Dr. Cobert), 219
Albuminuria, symptoms, pathology, and treatment (Dr. T. Lauder Brunton, F.R.S.), 352, 426
Alcohol, by Dr. B. W. Richardson (Review), 203
Alvarenza (P. F. da Costa), silicate of potash in the treatment of erysipelas, 293
Alveolar abscess (Mr. Isidore Lyons), 442
Ammonium, chloride of, in treatment of neuralgia, 412
Amussat (M.), galvano-caustic operations, 371
Anderson (Dr. James), etiology of hysteria, 124
Anderson (Dr. J. Keith), treatment of spasmodic asthma by the subcutaneous injection of morphia, 321
Angioma and its galvano-caustic treatment (A. Battig), 215
Antiseptic surgery (Mr. Lister), 378
Apollinaris natural mineral water, 384
Apomorphia, action of (Dr. Walter G. Smith), 381
Arsenic as antidotal to acute alcoholism (Dr. H. M. Fiske), 220
Arsenic: as a cure for pemphigus (Mr. Jonathan Hutchinson), 444; physiological action of (Kossell), 454
Arsenical paste in treatment of epithelionea, 452
Asarum canadense as an anthelmintic (Dr. J. Schaffirt), 289
Atropia and morphia, hypodermic effects of, 218

B.

Baker (Dr. C.), corium maculatum, 301
Barnes (Dr. Henry), paracentesis of the chest, 181
Barrallier (M.), therapeutic uses of lobelia, 305
Bastian (Dr. H. C., F.R.S.), "Paralysis from Brain Disease" (Review), 119
Baths, &c., employment of, during the menstrual period (Dr. Pradier), 132
Battig (A.), angioma and its galvano-caustic treatment, 215
Barwell (Mr.), variocele and its curative operation by subcutaneous wire loop, 49
Bedgown for sickness (Dr. T. Joyce), 288
Beef-tea as a food, 445
Benedikt (Prof.), general treatment of chronic nervous diseases, 56
Bennett (Dr. Henry), treatment of sickness during pregnancy, 125
Bennett (Dr. John Hughes, F.R.S.E.), "Researches into the Antagonism of Medicines" (Review), 362
Berens (Dr. J.), period of maximum death-rate, 291
Berger (Dr. O.), pathology and treatment of elastic or claw fingers, 379; gelsemium, 455
Benzoin in chronic dysentery (Mr. Donaldson), 136
Bibliography, 62, 147, 309, 385, 458
Bilateral irritation of the pneumogastric nerves in man (Dr. Thanhoffer), 206
Blanc (M.), external use of Goa powder, 294
Blood and other substances, their nutritive value (P. L. Paunve), 455
Bloodless operations, their duration (Professor Langenbeck), 284
Boils, sulphuric acid in treatment of (Dr. Madison), 135
Boracic acid in ringworm (Surgeon-Major Watson), 444
Bouchut (M.), treatment of vaginism, 146
Bradley (Dr. Messenger), new mode of treating certain tumours of the lymphatic glands, 287
Brakenridge (Dr. David J., F.R.C.P.E.) on use of quinine as a gargle in diphtheritic, scarlatinal, and other forms of sore throat, 110
Breast, abscess of the, 451
Breasts, strapping of, to prevent and arrest lactation (Dr. Munsen), 457
Brickwell (Mr.), treatment of tapeworm by creosote, 369
Bromide of ammonium in rheumatism (Dr. J. M. da Costa), 133
Bromide of iron in chorea (Professor da Costa), 217
Bromine, physiological action of the preparations of (Dr. Steinauer), 143
Bromoform as an anæsthetic, 214
Bronchial catarrh, pathology and treatment, 211

Brunton (Dr. T. Lauder, F.R.S.), symptoms, pathology, and treatment of albuminuria, 352, 426
Buchanan (Dr. George), tracheotomy in croup, 287 ; some directions for scientific work by medical officers of health, 386
Buchheim on action of cod-liver oil, 453
Bulkley (Dr.), treatment of skin disease in America, 209
Buren and Keyes (Drs.), non-mercurial treatment of syphilis, 144

C.

Calculous disease of the kidneys, its treatment and cure (Dr. W. F. Mc Nutt), 196
Camphor, bromide of (Dr. Pathault), 207
Carbazotate of ammonia as a substitute for quinine (Dr. I. Slane), 214
Carbolic acid, injection in traumatic erysipelas (Dr. Hirschberg), 134
Carbolic and salicylic acids in diabetes; their comparative value (Ebstein and Müller), 305
Carbuncular inflammation of the lip (Dr. J. Milner Fothergill), 434
Caspari (Dr.), treatment of chronic eczema, 213
Casse (Mons. J.), transfusion, 129
Cataract extraction (Dr. Charles Bell Taylor, F.R.C.S.E.), 340, 404
Catarrh of the urinary organs accompanied by ammoniacal fermentation of the urine (Gosselin and Robin), 293
Catarrhal jaundice, treatment of by electricity (Dr. Gerhardt), 219
Cephalalgia, treated by nitrate of amyl (Dr. R. A. Douglas-Lithgow), 364
Chirone (Dr.), action of quinine on muscular fibre, 456
Chloral as a local application for ulcers (Mr. Lucas), 368
Chloral hydrate : success of in cholera, 1—3 ; operation under Drs. J. & A. Nairne, 142
Chloral : in sea-sickness (Dr. Obet), 285; in tetanus, 299
Chlorate of potash, therapeutic action, 375, 453
Chocolate in chronic intestinal catarrh (Dr. Karner), 133
Cholera : how to prevent and resist it (Prof. Max V. Pettenkofer), 221 ; on the pathology and treatment of (Surgeon A. R. Hall), 1 ; success of chloral hydrate for, 1
Chronic nervous diseases, general treatment (Prof. Benedikt), 56 ; amyl nitrate in, 58 ; bromide of potassium, 58 ; nitrate of silver, 58 ; zinc preparations, 58
Cianciosi (Dr. Angelo), treatment of purpura hæmorrhagica by hypodermic injections of ergotine, 59
Cleland (Professor, M.D., F.R.S.), use of saccharated lime in typhus fever and other complaints, 401
Clinic of the month, July, 46 ; August, 122 ; September, 204 ; October, 284; November, 364 ; December, 442
Cobert (Dr.), ailanthus glandulosa in dysentery, 219
Cod-liver oil, action of (Buchheim), 453
Cod-liver oil emulsion, 225
Cohen (Dr. J. Solis) "Croup in its Relations to Tracheotomy" (Review), 199
Cold, treatment of a common (Dr. J. Milner Fothergill), 37
Confinement, keeping the bed after, 140
Congenital alopecia, microscopical appearances in, 367
Conium maculatum (Dr. C. Baker), 301
Copeman (Dr. E.), treatment of obstinate vomiting connected with pregnancy, 447
Costa (Prof. da), bromide of iron in chorea, 217
Creosote in treatment of tapeworm, 369
Croft (Mr.), serpiginous and phagedænic ulceration, and quinine, 55
"Croup, in its Relations to Tracheotomy," (J. Solis Cohen, M.D.,) (Review), 199
Croup, tracheotomy in, 287
Curran (Surgeon-Major, A., M.D.), excretions in native practice in India, 247
Currents on the nervous system, the action of induced and continuous, by Dr. Onimus, of Paris, 96, 162 (also v. xiv. p. 419)
"Cyclopædia of the Practice of Medicine," edited by Dr. von Ziemssen, vols. i. and ii., 41

D.

Da Costa (Dr. J. M.), bromide of ammonium in rheumatism, 133
Delhi sore or boil (Dr. Joseph Fayrer, C.S.I., F.R.S.E.), 264 ; synonyms, definition, geographical distribution, *ib.*; pathology and symptoms, 265 ; etiology, 266 ; prevention and treatment, 267
"Diabetes and Food, their Relation," (Dr. Arthur Scott Donkin,) (Review), 280
Diagnosis and treatment of secondary affections of the heart (Dr. Fothergill), 365

Diarrhœa of typhoid fever, the treatment of (Dr. G. Johnson), 167
Diarrhœa, its varieties and treatment (Dr. Milner Fothergill), 270
Dickinson (Dr. W. H.), "Diseases of the Kidney, and Urinary Derangements" (Review), 280
Dieulafoy's pneumatic aspirator for paracentesis of the chest, 193
Diphtheria: contributions to the pathology of (Dr. Jacobi), 59; ice in, 216; local forms of (Letzerich), 377
Disease, influence of occupation on, 123
"Diseases of the Heart and Aorta," (Professor Thomas Hayden,) (Review), 440
Donaldson (Mr.), compound tincture of benzoin in chronic dysentery, 136
Donkin (Dr. Arthur Scott), "On the Relation between Diabetes and Food" (Review), 280
Duplay (Dr.), periostitis of the temporal bone complicating purulent stitis, 51
Duplay (M.), comments on the treatment of foreign bodies in œsophagus, 61
Dysentery, treatment of chronic (Dr. H. Jones), 204

E.

Ebstein & Müller, comparative value of carbolic and salicylic acids in diabetes, 305
Eczema, chronic, treatment of (Dr. Caspari), 213
Eczema marginatum, Goa powder and Pohl di Balsa in treatment of, 14
Eddison (Dr. J. E.), treatment of scarlet fever by external application of cold water, 286
Elastic ligature for cure of webbed fingers (Dr. M. Vogel), 122
Elephantiasis arabum (Dr. J. Fayrer), 81
Empyema in children (Dr. Mackey), 364
Epidemiology in England, its recent progress (J. Netten Radcliffe), 459
Epithelionea treated by an arsenical paste (Dr. Felix Vencourt), 452
Epithetial tumours of the neck of the uterus treated by galvano-caustic wire (M. Labbé), 141
Ergot: injection in treatment of hæmorrhoids, 142; therapeutics of, 218; in excessive secretion of milk and inflammation of the mammary glands (Herr Schtscherbinenkoff), 141
Ergotine: in croupous pneumonia (Dr. Weisk), 61; hypodermically in uterine fibroids (Hildebrandt), 132; in treatment of purpura hæmorrhagica, 59
Erysipelas and child-bed fever, 158
Erysipelas, [illegible] of [illegible] in, 208
Esmarch's bloodless method (Dr. Henry Sands), 50
Evans (Dr. George H.), nitrate of amyl in facial neuralgia, 179
Excretions in native practice in India (Surgeon-Major William Curran, A.M.D.), 247
Extracts from Journals, 50, 129, 208, 289, 371, 445

F.

Faradisation of the ventricles of the heart in the dog (M. Vulpian), 130
Fayrer (Dr. Joseph, C.S.I., F.R.S.E.), elephantiasis arabum, synonyms, definition, 81; natural history, 82; treatment, 90; Dehli sore or boil, 264
Fingers, pathology and treatment of elastic or claw, 379
Finlayson (Dr.), course of the temperature in defervescence, 53
Filth diseases, Mr. Simon on the prevention of, 72
Fiske (Dr. H. M.), arsenic as antidotal to acute alcoholism, 220
Fothergill (Dr. J. Milner), on the treatment of a common cold, 37; treatment of primary disease of the heart, 47; diarrhœa, its varieties and treatment, 270; diagnosis and treatment of secondary affections of the heart, 365; carbuncular inflammation of the lip, 434
Fox (Dr. E. L.), "The Pathological Anatomy of the Nervous Centres" (Review), 200
Funkel (M.), nitrate of amyl in cardialgia and tetanus, &c., 134

G.

Galvano-caustic operations (M. Amussat), 371
Gargle, quinine, for sore throat, 113
Gelsemium sempervirens in the treatment of odontalgia (Dr. James Sawyer), 115; as an antispasmodic (Dr. A. Jurasz), 455; Dr. O. Berger, 455
Gerhardt (Dr.), catarrhal jaundice, 219
Gillette (M.), treatment of abscess of the breast, 451
Glycerine of borate of soda (M. Gaudolphe), 207
Goa powder and Pohl di Balsa in eczema marginatum (Dr. G. Shin), 14
Goa powder, external use of (M. Blanc), 294

Godon (Dr. F.W.), syphilitic ulceration of the œsophagus, diagnosis by auscultation, 289
Gonorrhœa: treatment of the complications of *Phymosis, Paraphymosis, Vegetations* (M. Ricord), 297; treated by a reversed current of fluid (Dr. J. Perrot Prince), 442
Goodell (Dr.), on keeping the bed after confinement, 140
Gosselin and Robin, catarrh of the urinary organs, &c., 293
Gout in surgery, treatment of (Sir James Paget), 46
Grimshaw (Dr.), pythogenic pneumonia, 138
Guillaud (M.), researches on the physiological properties of aconite and aconitina, 449

H.

Hæmorrhoids treated by injection of ergot (Dr. G. W. Semple), 142
Hall (Surgeon A. R.), pathology and treatment of cholera, 1
Hamilton (Dr. McLane), treatment of functional headache, 222
Hayden (Professor Thomas), "Diseases of the Heart and Aorta" (Review), 440
Haynes (Dr. Stanley), the domestic treatment of insanity, 329
Headache: from intracranial organic disease, treatment of (Dr. Moxon), 48; treatment of functional (Dr. Mc Lane Hamilton), 222
"Health in India for British Women, and on the Prevention of Disease in Tropical Climates" (Dr. E. J. Tilt), 45
Heart: action of jaborandi on the, 374; treatment of primary disease of (Dr. Fothergill), 47
Hemlock and its alkaloid, physiological action, 303
Hildebrandt, on ergotine in uterine fibroids, 132
Hirschberg (Dr.), carbolic acid injection in traumatic erysipelas, 134
Hopkins (Dr.), Villate's mixture in caries, 136
Hospitals, hygienic management of, 148
Hutchinson (Mr. Jonathan), Can arsenic cure pemphigus? 444
Hydatids in Australia, 214
Hydrocele of the tunica vaginalis, fluids contained in (Dr. Méhu), 52
Hygienic management of hospitals, 148
Hysteria cases (Thomas P. Tuckey, M.B., T.C.D.), 323
Hysteria, etiology of (Dr. James Anderson), 124

I.

Ice in diphtheria (Dr. G. Mayer), 216
Indian sanitary work, 227
Infectious diseases, the vacation in relation to, 78; the law in relation to, 78
Influence of the weather on the public health, 310
Insanity, domestic treatment of (Dr. Stanley Haynes), 328; moral treatment, 332; medicinal sedatives, 336
Intrarectal examination, dangers of (Dr. Robert F. Weir), 130
Intussusception, a way to distend the lower bowel (Dr. Douglas Morton), 20
Inventions in surgical mechanism, 308
Iodine, injection into the cavity of the uterus (Dr. Trask), 137, 373
Irish famine and its results, "History of the Great Irish Famine of 1847" (Rev. John O'Rourke, P.P.), 63
Isambert (M.), therapeutic action of chlorate of potash, 375, 453

J.

Jaborandi, its action on the heart (Mr. Langley), 374
Jacobi (Dr.), contributions to the pathology of diphtheria, 59
Johnson (Dr. George, F.R.S.), on the treatment of diarrhœa of typhoid fever, 107
Johnston (Dr. James), treatment of rheumatic fever, 286
Jones (Dr. H.), treatment of chronic dysentery, 204
Jones (Dr. H. M. and Dr. R. Atkins), microscopical appearances in congenital alopecia, 367
Jones and Sieveking (Drs.), "Manual of Pathological Anatomy" (Review), 117
Joyce (Dr. T.), new form of bed-gown for sickness, 268
Jurasz (Dr. A.), Gelseminum sempervirens as an antineuralgic, 455

K.

Karner (Dr.), chocolate in chronic intestinal catarrh, 133
Keeping bed after confinement (Dr. Goodell), 140
"Kidney Diseases and Urinary Derangements (Dr. W. Howship Dickinson (Review), 280
Kossell on the physiological action of arsenic, 454

L.

Labbé (M.), epithetial tumours of the neck of the uterus treated by galvanocaustic wire, 141

Langenbeck (Professor), duration of bloodless operations, 284
Langley (Mr.), action of jaborandi on the heart, 374
Laptschinsky (M.), pathology of the blood, 379
Larison (Dr. C. W.), nitrous oxide in tubercolosis, 219
Laudau (Dr. Leopold), nutæna in the newborn infant, 382
Law, the, as to infected persons or things, 78
Lead colic, treated by large enemata of luke-warm water (Dr. Riesland), 449
"Lectures on Pathological Anatomy" (Dr. Samuel Wilks, F.R.S. and Dr. W. Moxon), (Review), 117
Leo (Dr.), propylamin in acute rheumatism, 446
Letzerich on diphtheria, 377
Leukæmia, treatment of (Dr. Ordenstein), 456
Lewis (T. R., and D. D. Cunningham), "Report of Microscopical and Physiological Researches into the Nature of the Agent or Agents producing Cholera" (Review), 238
Lip, carbuncular inflammation of, 434
Lister (Mr.), antiseptic surgery, 378
Liveing (Dr. R.), "Treatment of Skin Diseases" (Review), 202
Lobelia, therapeutic uses of (M. Barrallier), 305
Longman (W.), Madeira as a health resort, 290
Lucas (Mr.), chloral as a local application for ulcers, 368
Lücke (Dr.), on transparency as a symptom in solid tumours, 371
Lymphosarcoma treated by arsenic (Dr. Tholen), 298
Lyons (Mr. Isidore), treatment of alveolar abscess, 442

M.

Maccormac (Dr. H.), treatment of porrigo, tinea favosa, &c., 261
McNutt (Dr. W. F., M.R.C.S., L.R.C.P., Edin.), treatment of calculous disease of the kidneys, 196; prescription for, and treatment of, 198
Mackey (Dr.), empyema in children, 364
Madeira as a health resort (W. Longman), 290
Madison (Dr.), sulphuric acid in the treatment of boils, 135
Mahomed (Dr. F. A., M.R.C.P.), contribution to the clinical history of scarlatinal convalescence, 21
"Manual of Pathological Anatomy" (Dr. C. H. Jones, F.R.S., and E. H. Sieveking), edited by J. F. Payne, M.D. (Review), 117
Matteo Lanzi, and Terrigi (Drs.), nature of paludal miasm, 295
Mayer (Dr. G.), ice in diphtheria, 216
Méhu (Dr.), fluids contained in hydrocele of the tunica vaginalis, 52
Microscopical appearances in congenital alopecia (Drs. H. M. Jones and R. Atkins), 367
"Microscopical and Physiological Researches into the Nature of the Agent or Agents producing Cholera," by T. R. Lewis and D. Cunningham (Review), 238
Morey (Dr.), strychnia eating, 220
Morphia: in treatment of uræmic convulsions, 142; effects of subcutaneous injection in chronic Bright's disease (R. Park, L.F.P.S.G., L.S.A.), 241
Morphia and atropia, hypodermic effects of, 218
Morton (Dr. Douglas), a good way to distend the lower bowel in intussusception, 20
Moxon (Dr.), treatment of headache from intracranial organic disease, 48
Munsen (Dr.), strapping the breasts to prevent and arrest lactation, 457
Murrell (William, L.R.C.P.), typhoid fever fatally treated by digitalis, 345
Mustard foot-bath in urticaria, 290

N

Nalene (Drs. J. and A.), operation under chloral hydrate, 142
Neuralgia: treated with chloride of ammonium (Dr. David Young), 412; diagnosis and treatment (V. Pitha), 60
Nitrate of amyl: in cardialgia and tetanus, &c. (M. Ewald), 134; in facial neuralgia, 179; in nervous cephalalgia (Dr. R. A. Douglas-Lithgow), 361
Nitrous oxide in tubercolosis (Dr. C. W. Larison), 219
Non-mercurial treatment of syphilis (Drs. V. Buren and Keyes), 144
Nutæna in the new-born infant (Dr. Leopold Laudau), 382

O.

Orff (Dr.), chloral in scarlet fever, 285
Occupation on disease, influence of (Dr. Balthazar Foster), 129
Odontalgia, gelseminum sempervirens in the treatment of, 115

Œsophagus : treatment of foreign bodies in the, comments by M. Duplay on a case by Krishaber, 61 ; syphilitic ulceration of the, 289
Onimus (Dr.), on the difference of the action of induced and continuous constant currents on the nervous system (continued from vol. xiv. p. 419) ; importance of these facts as a means of diagnosis, 96 ; causes of difference in effects produced by currents, 99 ; on electric currents in the tissues, 163 ; negative oscillations of the current, 165 ; electrotonic state, 168 ; cathelectrotonus and anelectrotonus, 170 ; table indicating results on electrifying a motor nerve, 173
Opium poisoning treated by subcutaneous injection of atropine (Gopard Chunder Roy), 297
Ordenstein (Dr.), treatment of leukæmia, 456
O'Rourke (Rev. John P. P.), "History of the Great Irish Famine of 1847," 63
Oxygen, therapeutical effects of (M. Tamin-Despalle), 60 ; as an antidote in poisoning from phosphorus (M.M. Thiernesse and Casse), 140

P.

Paget (Sir James), treatment of gout in surgery, 46
Paludal miasm, nature of (Drs. Matteo Lanzi and G. Terrigi), 295
Paracentesis of the chest (Dr. H. Barnes), 181
"Paralysis from Brain Disease in its Common Forms," Dr. H. C. Bastian, F.R.S. (Review), 119
Park (R., L.F.P.S.G., L.S.A.), effects of morphia injection in chronic Bright's disease, 241
Parkes (Dr. E. A., F.R.S.), "Issue of a Spirit Ration during the Ashantee Campaign of 1874" (Review), 120
Pathault (Dr.), bromide of camphor, 207
Pathognomic symptom of the moribund condition (Dr. Shrady), 56
"Pathological Anatomy of the Nervous Centres," by Dr. E. L. Fox (Review), 200
Pathology and treatment of elastic or claw fingers (Dr. O. Berger), 379
Pathology of the blood (M. Laptschinsky), 379
Paume (P. L.), nutritive value of blood and other substances, 455
Peacock (Dr.), report on cases of pneumonia, 55
Pemphigus, arsenic as a cure, 444
Pepsin-Essenz, 225
Period of maximum death-rate (Dr. J. Berens), 291
Periostitis of the temporal bone, complicating purulent otitis (Dr. Duplay), 51
Pettenkofer (Prof. Max V.), cholera, how to prevent and resist it, 221
Piffard (Dr. Henry G.), treatment of the scrofulides (lupus), 415 ; erythematous and corneous scrofulides, 416 ; pustular scrofulide, 418 ; tubercular scrofulide, 419 ; phlegmonous scrofulide, 422
Pitha (V.), diagnosis and treatment of neuralgia, 60
Pneumonia : some facts concerning (Dr. Rodman), 54 ; report on cases of (Dr. Peacock), 55 ; ergotine in croupous, 61
Poisoning, oxygen as an antidote in, 140
Polymnia Noedalia, therapeutic uses of, 295
Popliteal aneurism cured by pressure (Alex. Turnbull, staff-surgeon, R.N.), 284
Porrigo, tinea favosa, &c., treatment of (Dr. H. Maccormac), 261
Porter (Surgeon-Major J. H.), "Surgeon's Pocket Book" (Review), 201
Potash, therapeutic action of chlorate of, 375, 453
Potter (Dr.), uræmic convulsions treated by morphia, 142
Pradier (Dr.), employment of baths during the menstrual period, 132
Pregnancy, treatment of vomiting connected with, 447
Pretz (Dr. J.), novel treatment of sciatica, 224
Prince (Dr. J. Perrot), gonorrhœa treated by a reversed current of fluid, 442
Propylamin in acute rheumatism (Dr. Leo), 446
Pruitt (Dr. J. W.), therapeutic uses of polymnia noedalia, 295
Puerperal fever, debate at Obstetrical Society, 126
Purpura hæmorrhagica, treatment by hypodermic injections of ergotine (Dr. Angelo Cianciosi), 59
Pythogenic pneumonia (Dr. Grimshaw), 138

Q.

Quinine for ulcers, 55
Quinine as a gargle in sore throat (Dr. D. J. Brakenridge), 110
Quinine on muscular fibre (Dr. Chirone), 456

R.

Radcliffe (J. Netten), recent progress of epidemiology in England, 459
Reports of the Medical Officer of the Privy Council, &c. (Mr. Simon) on filth diseases, 71
"Researches into the Antagonism of Medicines," by Dr. John Hughes Bennett, F.R.S.E. (Review), 362
Reviews, 41, 117, 199, 280, 362, 440
Rheumatic fever, treatment (Dr. James Johnston), 286
Rheumatism, bromide of ammonium in, 133
Rheumatism treated by propylamin, 446
Richardson (Dr. B. W.), "On alcohol," (Review), 203
Ricord (M.), treatment of the complications of gonorrhœa, 297
Riesland (Dr.), treatment of lead colic by large enemata of luke-warm water, 449
Ringworm treated by boracic acid, 444
Roberts (Dr. S. H.), external use of turpentine in the treatment of tonsillitis, 134
Rodman (Dr. W. B.), some facts concerning pneumonia, 54

S.

Saccharated lime in typhus fever and other complaints (Professor Cleveland, M.D., F.R.S.), 401
Sands (Dr. Henry), Esmarch's bloodless method, 50
Sanitary legislation during the last session, 316
Sanitary work in India, 227
Sawyer (Dr. James, M.R.C.P.), gelseminum sempervirens in the treatment of odontalgia, 115
Scarlatina, pulse tracings, 25; albuminuria, 29
Scarlatinal convalescence, contribution to clinical history of (Dr. F. A. Mahomed), 21
Scarlet fever, treatment by external application of cold water (Dr. J. E. Eddison), 286
Schaffirt (Dr. J.), asarum canadense as an anthelmintic, 289
Schliep (Dr. Paul), treatment by means of the stomach pump, 375
Schtscherbinenkoff (Herr), ergot in excessive secretion of milk and inflammation of the mammary glands, 141
Sciatica, novel treatment of (Dr. J. Pretz), 224
Scientific work by Medical Officers of Health (Dr. George Buchanan), 386
Scrofulides (Lupus), treatment of (Dr. Henry G. Piffard), 415
Sea-sickness, chloral in, 285
Semple (Dr. G. W.), treatment of hæmorrhoids by injection of ergot, 142
Senna, active principle of, 135
Shrady (Dr. John), a pathognomonic symptom of the moribund condition, 56
Sickness during pregnancy (Dr. Henry Bennett), 125
Silicate of potash in the treatment of erysipelas (P. F. da Costa Alvarenza), 293
Simon (Mr.), on the prevention of filth diseases, 72
Skin diseases in America, treatment of (Dr. Bulkley), 209
"Skin Diseases, Treatment of," by Dr. R. Liveing (Review), 202
Slane (Dr. I.), carbazotate of ammonia as a substitute for quinine, 214
Slop-water, disposal of, 154
Smith (Dr. Heywood), sterility from anteflexion of uterus and stricture of internal os uteri, 125
Smith (Dr. Walter G.), action of apomorphia, 381
Spasmodic asthma treated by the subcutaneous injection of morphia (Dr. J. Keith Anderson), 321
Spiegelberg (Professor), rapid dilatation of the urethra in women, 448
"Spirit Rations during the Ashantee Campaign of 1874," (Dr. E. A. Parkes, F.R.S.,) (Review), 120
Squire (Dr. Balmanno), influence of occupation on disease, 123
Steinauer (Dr.), physiological action of the preparation of bromine, 143
Steiner (Prof.), the inoculation of varicella, 373
Sterility from anteflexion of uterus and stricture of internal os uteri (Dr. Heywood Smith), 125
Stomach-pump treatment (Dr. Paul Schliep), 375
Strychnia eating (Dr. Morey), 220
Sulphuric acid in the treatment of boils, 135
"Surgeon's Pocket Book," by Surgeon-Major J. H. Porter (Review), 201
Syphilis, non-mercurial treatment, 144
Syphilitic ulceration of the œsophagus, diagnosis by auscultation (Dr. F. W. Gosset), 289

T.

Tamin-Despalle (M.), therapeutic effects of oxygen, 60
Tapeworm treated by creosote (Mr. Brickwell), 289
Taylor (Dr. Charles Bell, F.R.C.S.E.), [illegible] extension, 349, 474

Temperature in defervescence, course of the (Dr. Finlayson), 53
Tetanus, employment of chloral in, 299
Thanhoffer (Dr.), bilateral irritation of the pneumogastric nerves in man, 206
Therapeutic uses of polymnia noedalia (Dr. J. W. Pruitt), 295
Therapeutics of ergot, 218
Thiernesse and Casse (M.M.), oxygen as an antidote in poisoning from phosphorus, 140
Thin (Dr. G.), Goa powder and Poh di Bahia in eczema marginatum, 14
Tholen (Dr.), treatment of lymphosarcoma by arsenic, 298
Tilt (Dr. E. J.), "Health in India for British Women, and on the Prevention of Disease in Tropical Climates," 45
Tracheotomy in croup (Dr. George Buchanan), 287
Transfusion (M. J. Casse), 129
Transparency, a symptom in solid tumours (Dr. Lücke), 371
Trask (Dr.), injections of tincture of iodine into the cavity of the uterus, 137, 373
Typhoid epidemic, apparently arising from infected milk (Dr. Ogston), 139
Typhoid fever fatally treated by digitalis (William Murrell, L.R.C.P.), 345
Typhus fever, &c., use of saccharated lime in, 401
Tyson (Dr. James), "Practical Examination of Urine" (Review), 117
Tubercolosis, nitrous oxide in, 219
Tuckey (Thomas P., M.B., T.C.D.), cases of hysteria, 323
Tumours of the lymphatic glands, new treatment (Dr. Messenger Bradley), 287
Tumours, transparency as a symptom, 371
Turnbull (Mr.), popliteal aneurism cured by pressure, 284
Turpentine in the treatment of tonsillitis (Dr. S. H. Roberts), 134

U.

Ulceration, serpiginous and phagedænic, and quinine (Mr. Croft), 55
Uræmic convulsions treated by morphia (Dr. Potter), 142
Urethra in women, rapid dilatation of the (Professor Spiegelberg), 448
"Urine, Practical Examination of," Dr. James Tyson (Review), 117
Urticaria, mustard foot-bath in, 290
Uterine asthma (J. Waring-Curran, F.R.C.S., L.K.Q.C.P.I., L.R.S.C.I.), 423

V.

Vacation, the, in relation to infectious diseases, 78
Vaginism, treatment of (M. Bouchut), 146
Varicella, inoculation of (Prof. Steiner), 373
Varicocele and its curative operation by subcutaneous wire loop (Mr. Barwell), 49
Vencourt (Dr. Felix), treatment of epithelionea by an arsenical paste, 452
Villate's mixture in caries (Dr. Hopkins), 136
Vogel (Dr. M.), elastic ligature for the cure of webbed fingers, 122
Vomiting connected with pregnancy (Dr. E. Copeman), 447
Vulpian (M.), faradisation of the ventricles of the heart in the dog, 130

W.

Waring-Curran, (J., F.R.C.S., L.K.Q.C.P.I., L.R.C.S.I.), uterine asthma, 423
Water, external application in scarlet fever, 286
Watering places and health resorts, health of, 236
Watson (Surgeon-Major), boracic acid in the treatment of ringworm, 444
Webbed fingers, elastic ligature for cure of, 122
Weir (Dr. Robert F.), dangers of intra-rectal examination, 130
Wilks, Dr. Samuel, and Dr. Walter Moxon, "Lectures on Pathological Anatomy" (Review), 117
Wycisk (Dr.), ergotine in croupous pneumonia, 61

Y.

Young (Dr. David), neuralgia treated with chloride of ammonium, 412

Z.

Ziemssen (Dr. H. Von), "Cyclopædia of the Practice of Medicine," vols. i. and ii., 41

LONDON: R. CLAY, SONS, AND TAYLOR, PRINTERS, BREAD STREET HILL.

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